GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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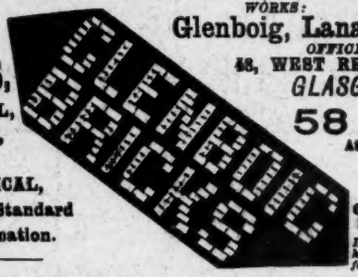

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CXLVII., No. 2940.] TUESDAY, SEPTEMBER 16, 1919. [71ST YEAR.

EDITORIAL NOTES.

Time Presses.

IT may be accepted with a fair amount of confidence that from existing costs (save in respect of that pernicious order which compels gas undertakings in southern areas to take, at a greatly enhanced figure, seaborne in place of railborne coal) there will not be any substantial recession. Examine the position how one will, no ground can be found for the expectation that coal at the pithead will descend much in price; and to the present levels of wages the trade unions have made the intention plain that they are going to adhere tenaciously. With coal and labour at such high levels, it is equally plain that the cost of structural materials and manufactured goods will not come down greatly—at any rate for some time to come. The peeling-off of excess profits, with increased production, and the bringing to aid of all possible economies, should effect some lowering of prices. But we see no reason for anticipating that, with all that can be done, we shall get into proximate line with the old prices. As to coal and wages, some economy will be produced, but by no means a counterbalancing economy, by increasing the yield of gas per ton of coal carbonized. We cannot put a net money value upon these possible, but as yet not fully realized, things. However, we know now of a certainty that the economic conditions of the past will not be revived; and therefore the last ray of hope has banished that, without the aid of Parliament in releasing the industry from the old financial conditions and in producing and authorizing new ones, investors in gas undertakings will ever again get what Parliament, under pre-war normal conditions, determined was a fair return upon their capital. We hope that the new Parliament, permeated as it is by a large amount of business ability and knowledge, will see that the blot upon the common sense and justice of the British Legislature—the Statutory Undertakings (Temporary Increase of Charges) Act—is quickly removed, and that in its place justice is re-established.

The Central Executive Board of the National Gas Council we see from their minutes published in another column, are of opinion that the industry is entitled to ask for legislation that would secure to them a pre-war dividend. This is very modest. When one comes to consider what investors are "entitled" to, one has to take into account changed conditions. The pre-war dividend would to-day have only half its pre-war purchasing value, if income-tax were now as then. But it is not as then, nor is it likely to be for many a long day; and so the pre-war dividend has now less than half its pre-war value. New capital is not satisfied with the old rates of return; and the capital that has had its part in the building-up of the business, and has been the victim of gross injustice, ought in strict equity to be given at any rate equality with new capital. Capital is just as much an essential in business as labour and materials; and so there is no need to argue in these times as to its right to a fair return under changed conditions. So we hope the National Gas Council will not at this critical juncture trim its application too close. The additional cost per 1000 c.ft. for providing a fair return on capital would be relatively small; and if gas production per ton of coal and gas sales are going to increase as it is hoped they will, the cost per 1000 c.ft. will progressively diminish. While correcting inconsistencies as between past and present, let the correction be not on any nominal figure applying to the past, but on the conditions of the present, with an eye upon the beneficial effects of so doing, and upon the ability, through expansion of business, of meeting the additional obligation.

Government Departments, as a rule, are not fast-moving in matters of reform. But the Board of Trade realize the iniquity to investors in the gas industry of the present conditions; and the Central Executive Board of the National Gas Council have "every reason to hope that before long "the gas industry will be placed on a better footing than "at present." This mode of expression is again modest and cautious. "Every reason to hope" and "before long" may sound quite satisfactory; but the expressions are somewhat indefinite, and the "better footing" does not show any superlative anticipation. The indefiniteness is accentuated when we read that the meeting decided to urge the Board of Trade to make known, as early as possible, the steps they propose to take with regard to the financial hardships and other difficulties under which the gas industry labours, in order that gas undertakings generally may be spared the cost and time of preparing and introducing measures dealing with their own "special" difficulties. If the difficulties are "special" to an undertaking, special legislation will have to be introduced, despite what the Board of Trade do. But on the general questions, unless the Board of Trade give some prompt indication of their intentions in respect of financial hardships, we fail to see how many suffering gas undertakings will be able to postpone taking initial steps towards making application to Parliament next November. Otherwise, what will it mean? If procrastination continues, hope of getting a general measure through next session will begin to disappear; and the fear will be that a considerable time will have to elapse before the industry obtains redress.

Meanwhile, gas share and stock holders are becoming more and more uneasy; the industry is sinking deeper and deeper into the mire of adverse conditions, while the gas business itself shows magnificent strength, and urgently invites progressive action, and the application of sound conditions. We are strongly and ardently in favour of the industry moving as one in these matters; but we are at a stage now when a time-limit must be placed upon the advice given in the following extract from one of the minutes of the Central Executive Board: "Before considering the promotion of Bills of "their own, which it was understood to be the intention of "certain undertakings that had been specially hard hit, the "Chairman strongly advised them to give the authorities a "chance of proving their good intentions." What is to be the duration of the "chance"? There is not much spare time between now and November, when notice of private promotions must be given. We earnestly hope there will be concerted action through the National Gas Council, and that the Board of Trade will be the channel of approach to Parliament. If, however, the Board of Trade does not move quickly, and if the National Gas Council cannot do so, regrettably we shall have to come to the conclusion that gas undertakings will be wise to be prepared, by giving thorough consideration to the lines of individual application, unless some positive assurance can be given as to definite central action, of a comprehensive and satisfactory order, within a reasonable time. The latter is the correct thing; it is what we have been fighting for. But what is the alternative if this fails us in the next few short weeks? There is only one, and that individual action. Nothing but greater certainty than is given us by the last report of the Central Executive Board will avoid what most responsible men in the gas industry desire to see avoided—separate instead of combined movement, and through the Board of Trade, who know so well the intolerable position of the industry.

The Super Gas-Refiners at Work.

A Sub-Committee of the Fuel Economy Committee of the British Association has been sitting in judgment upon the report of the Board of Fuel Research as to the policy that should be adopted in future in connection with the quality, and the method of charging for, gas. After reading the Fuel Economy Sub-Committee's report (which has been accepted by the full Committee), one feels very much inclined to tell the members to mind their own business, and not to meddle in that which is something that has to be settled between the gas industry as a whole, the Board of Fuel Research on behalf of the Board of Trade, and Parliament. The gratuitous interference will be anything but welcome to the gas industry; and more especially in view of the fact that the Committee not only endorse what the gas industry objects to in the Board of Fuel Research Committee's report, but proposes the infliction of still further restrictions.

It is seen that the report of the Sub-Committee was adopted by an eight to one majority—the dissentient one being Mr. Douglas H. Helps, representing the Institution of Gas Engineers. There were eleven other members on the Committee; so apparently three did not vote. Why did they not do so, and who were they? We note the name of Mr. H. James Yates, as representing the Society of British Gas Industries. Surely he does not want to see further restrictions imposed upon gas supply! We observe the name of Mr. E. V. Evans, the Chief Chemist of the South Metropolitan Company, who have announced their intention of accepting the report of the Fuel Research Board *in toto*; and so we know that the Company, once the champions of freedom, are now willing to become the slaves of restriction. There is not another member directly associated with the gas industry. The interests of Mr. D. V. Hollingworth and Mr. E. Bury are concentrated in the coking industry; and those of Mr. W. H. Patchell in the electricity supply industry! There is Sir Robert Hadfield, Dr. J. E. Stead, Mr. A. H. Barker, Mr. A. Hutchinson, and Mr. Robert Mond, not one of whom has direct association with the gas industry. And lastly there is Prof. W. A. Bone—the erstwhile technical adviser to the Fuel Research Board, from which position he subsequently resigned. He delivered a series of Cantor Lectures last spring at the Royal Society of Arts; and this report, "adopted" by a majority of eight to one, incorporates certain of the views that were expressed in the Cantor Lectures. Is it that the glamour of Prof. Bone has caught the members of the Committee, or is it that want of chemical knowledge and of practical experience in gas supply has caused a majority of the eight to accept simply and unresistingly—perhaps in some cases perfunctorily—the extreme refinements which are advocated in the report, and the necessity for which practical experience does not sanction?

The section in question of the report is published *in extenso* later in this issue. Briefly, what is proposed is something that would confine the gas industry in all directions; and the industry is not by any means willing to submit, and will not be thankful to those who urge for it further gyves. In the first place, the Committee would have the industry retricted to a calorific value of 450 B.Th.U. gross, to a minimum of 20 p.ct. of methane, to a maximum of 20 p.ct. of carbon monoxide, and to not more than 12 p.ct. of inerts. They also favour the complete removal of sulphur compounds, and suggest legislation making sulphur removal generally compulsory for all large gas undertakings. Within the limits laid down, it is urged, gas undertakings would be able to supply for domestic use either (*a*) straight coal gas; (*b*) debenzolized coke-oven gas; or (*c*) a mixture of 100 parts of coal gas with up to 50 parts of blue water gas. It will be seen from this that (while allowed in the case of coke-oven gas used for town purposes) benzol extraction from coal gas produced in gas-works would be cut out; and that to secure the other conditions, the use of blue water gas would be limited to 33 p.ct. For gas supplied in bulk for industrial purposes, the Committee would not object to some relaxation.

On what ground do the Committee propose to strengthen the ring-fence that is already about the gas industry? Is there a substantial case for it? The Committee, (or those members or the member of it who drafted the report) appear to have in view "reasonable safety" rather than ultimate economy. They are quite right in suggesting "reasonable "safety." Where, however, is the evidence that gas supply is not "reasonably safe" now? During the war, there has been a large experience with all sorts of mixtures and compositions of gas; and the explosions and poisonings have been no more frequent than before the war, when methane was relatively higher and carbon monoxide was lower than in the latter years of the war. The principal reason why Prof. Bone has a partiality for methane is because of its, with air, low rate of explosibility. But gas with a very low percentage of methane has been distributed of late years; and its explosibility has not protruded itself upon attention in any abnormal manner. Only in March last, on the platform at the Royal Society of Arts, Prof. Bone was not taking quite the positive attitude that is found in this report. He was then suggesting that the question of methane was one that should be carefully inquired into, with a view to determine its precise importance, and whether or not a minimum should be established. Have the inquiry and determination been made? If not, why have the Sub-Committee of the Fuel Economy Committee settled on 20 p.ct.? As to the limitation of the carbon monoxide, the proposal is the adoption of the percentage limitation recommended in 1899 by the Home Office Committee. The twenty years that have passed have not disclosed any evidence as to the necessity of such a limitation; and the fears of the Committee of that year have proved to be altogether groundless. As to the sulphur compounds, it must not be overlooked, that while gas is being largely used for lighting, it is by the incandescent burner, with its low consumption for domestic purposes, and that the bulk of gas is now burned for heating purposes, with means of carrying away the products of combustion to the outside air. The times have changed, and so have the applications of gas. As to the B.Th.U. per cubic foot and the percentage of inerts, the reports of the Gas Investigation Committee upon the results of research with various gas mixtures have shown that efficiency is (approximately speaking) proportional to the calorific power per cubic foot, and that efficiency is not substantially affected by the percentage of inerts.

In all these and other matters, we cannot discard the results of such investigations nor the lessons of practical experience; nor can the country and the people in these days afford to pay for refinements which a world-wide and several decades of experience declare to be unnecessary. Against this experience there cannot prevail the opinions and declarations of eight men, only one or two of whom know anything about the subject, and they with a predilection for chemical refinements. The industry's, the consumer's, and the national economy must also have consideration. The "Fuel Economy" Committee evidently require to be reminded first of their title, and, secondly, that they have not proved the absence of "reasonable "safety" from gas as now distributed.

Power.

During the war, the country showed the enormous amount of latent energy that it possessed, and did many marvellous things—not only by turning smartly from peace pursuits to the bulk production of war material, but by setting to work to discover greater efficiency and means to meet requirements instituted by development, not our own only, but that of the enemy. The war period has been packed with illustration of how fresh development has created new requirement, which has had to be satisfied; and in this the country has been highly successful. It has shown a large potentiality, of which it had little or no general knowledge; and it is an asset of no mean importance to-day. The formerly latent power that has been brought to bear during the war must be utilized in other directions and for fresh purposes, now that the war is over. For there must be development upon development of the country's resources if it is to re-establish itself, clear off its mountainous debt, and expand and prosper. Therefore upon discovery and development there must be concentration. Failing new and unexpected discoveries in science, the great position of England cannot be maintained for an indefinite period.

This is the view of one of our giants in science and industry, whose work has achieved so much for the industries of the nation, and in bringing closer together, through the agency of mechanical power, all parts of the earth. Expression of this view is found in the Presidential Address of the Hon. Sir Charles A. Parsons, K.C.B., F.R.S., to the British Association. Natural it was that the developer of the steam-turbine as we know it to-day should in his address have directed his attention in large part to power topics.

But great as is the efficiency of the turbine under the best of circumstances, Sir Charles is not prepared to say that it represents the apex of power development. He hopes for new discovery on new lines. It is claimed that in turbines of from 20,000 to 30,000 H.P. 82 p.ct. of the available energy in the steam in now obtainable as brake horse power; and with a boiler efficiency of 85 p.ct., the thermo-dynamic efficiency from the fuel to the electrical output of the alternator has reached 23 p.ct., and shortly may reach 28 p.ct. This result, the President points out, rivals the efficiency of the internal combustion engine worked by producer gas. The efficiency is a remarkable performance; but what we are interested in chiefly is the translation of this efficiency to the factories where the power is wanted and the work is done, where smaller power units are required, and where rivalling efficiencies can be produced by the internal combustion engine even with such inferior fuel as producer gas. It is mainly in size that the turbine has gone so far ahead, and it enjoys the ability of maintaining its efficiency over a wider range of load than the gas-engine, which works at its best with a high load factor.

In looking for possible developments, the President does not expect any immediate assistance to the country from the harnessing of water power, of which we have a small amount compared with certain other countries. The average capital cost of producing electrical power from coal is less than half what it is in the case of water power. On the other hand, the running costs are much less. But it is not likely that such water power as we have will be developed until capital becomes more plentiful, and capital costs more reasonable. Then it might be well worth while spending the capital to obtain the economy of the lower running costs. We are sorry that, in dealing with these matters, Sir Charles did not (he is a member of the Fuel Research Board) find an opportunity of saying something regarding the position of the gas industry in the utilization of coal; and the necessity for giving it freedom in developing its services to mankind, instead of limiting its power for service by parliamentary enactment, which, to say the least, is a senseless proceeding.

To "Compel" the Government.

THE Trade Union Congress at Glasgow last week put a new complexion on the position of labour affairs; and there would be no prudence in trying to minimize the situation, and probably be caught napping. For years the Trade Union Congress has passed resolutions which have affirmed and reaffirmed its adherence to nationalization; and so this year Mr. Robert Smillie had congenial soil upon which to work when he was able to bring forward a report by a "majority" of the Coal Commission, recommending the Government to carry out a scheme of nationalization of the coal mines. The members of the Commission constituting the majority, which happened to number seven, need not be specified; but they were not men in the same street for experience of industry and affairs generally as were the minority, numbering six, who were all favourable to nationalization of the coal, but not of the mines, and over these they suggested a large measure of control. It was therefore too much to expect the Congress to turn its back on the old nationalization resolutions; and one thing we may be quite sure about is that the Congress is not in any way weakening on nationalization. The only point upon which there may be a difference of opinion is as to how the Government are to be moved in the matter. Nothing short of nationalization, it seems, will satisfy the Congress, if the block vote correctly represents the individual opinions of the members of the Unions, which we greatly doubt. It is much more likely to represent only the opinions of the men who are authorized to exercise the vote.

At the instance of Mr. Smillie, the Congress rejected the Government's alternative scheme to nationalization; resolved to co-operate with the miners to "compel" the Government to adopt the scheme of national ownership; and instructed the Parliamentary Committee, in conjunction with the Miners' Federation, to interview immediately the Prime Minister on the matter, and, in the name of the entire labour movement, to "insist" upon the Government adopting the majority report. If this has not a successful issue from the Trade Unions' standpoint, a special congress is to be convened so as to decide the form in which compulsion should be applied to the Government. "Compel" and "insist" are words of unequivocal significance; and they indicate that the Congress believes in its strength, intends to stand very resolute, and will not accept any alternative. That is the plain reading of it. It must be the Sankey report or the application of compulsion to the Government, which has only one meaning—that the trade unions (so it is proposed) are to be made revolutionary agencies, and are to be employed in an endeavour to destroy democratic government. It is easy to use the words "compel" and "insist;" but the compulsion and insistence are matters which concern not only the Government but the whole country. What the trade unions, or certain leaders, are failing to recognize at this juncture is that they are only a part of the body politic. We hear a great deal about the rights of the trade unions; we hear much less from the same sources as to the rights of other people. They say to the other people: "We are deciding for you, because "we know what is best." This is not constitutional; it is not democratic government; it is unadulterated despotism, against which, in other people, the trade unions would have something very bitter to say. The country will not accept nationalization at the command of a section of the people. The section may menace; but the Government must defend constitutional principles and methods. Trouble may come; but the national will must settle whether it is to govern, or hand itself over to what is nothing short of brute force. Whatever comes, the nation must do the compelling and insisting; and whatever the nation says should be done, must be done.

There is confidence that the leaders themselves know they are skating on very thin ice in this matter, and that they are proposing something that is repugnant to the general feeling of the country. Mr. Smillie does not care. He has a narrow mind, a narrow outlook, and dull sense. Mr. J. H. Thomas, the railwaymen's leader, is somewhat more sensitive; but he, too, has to espouse nationalization, because it has long been an item in his Union's programme. It is plain that Mr. Thomas knows in strict justice that these nationalization questions are matters for the nation, and not alone for labour unions—that nationalization is a question of national policy, and therefore a political question, and not merely an internal industrial one. Mr. Smillie does not address more than the "fellow workers" of the miners—he does not include all his fellow countrymen—in proclaiming that the miners are not seeking nationalization for themselves alone. And the full extent of his ambitions are not as yet divulged—only hinted at. "There is no-"thing," he asserts, "of the Syndicalist idea in our claims "at the present time; but the time may come when the in-"dustries of the country may advance a step further than "we are asking at the present time." This is not clever on the part of Mr. Smillie. It is, however, for other people a sufficient revelation of the man at war with his fellow countrymen. If, as Mr. Smillie says, the time has arrived when it would be criminal on the part of trade union leaders to do anything else than advise a strike of their people should certain circumstances arise, then (after his indication that this nationalization of the coal mines is but the beginning of a programme leading to Syndicalism) it would be criminal on the part of the nation to allow these headstrong ones to succeed now in opening-up courses that would result in a total subversion of all that is constitutional and democratic, and sterilize our national life by dragging private enterprise and endeavour into the vortex created by the realization of mad desires.

There was much talk of justice for the miners. Looking at their wages and their hours, and the offer of the Government for representation in the control of the mines, more than "justice" has been meted out to them. One may ask, What about justice for other people? Upon this the Trade Union Congress is silent. Mr. Thomas says that the nationalization question is a citizens' one. We agree; but not with his suggestion that, nevertheless, the Unions should settle this question for the citizens as a whole. But his idea is that, in connection with railway nationalization, the ordinary citizen is fully safeguarded, because he and his friends believe that, while nationalization will be beneficial to the railwaymen, their interest is consistent with the interests of the State as a whole. So the interest of the citizen who is not a railwayman is limited to reaping the fruits of nationalization, whether the crop be good or bad. He is not to have any interest in saying whether or not he wants nationalization of this or that. It is very kind indeed of the Unions to take upon themselves the thinking for the rest of the community. We have an equality of rights with the

good fellows who drive the engines, stoke the furnaces, work as guards or signalmen, and in other ways. We do not want to deprive them of their rights as citizens; and we object to them assuming that they have a right to deprive us as citizens of a voice and a vote in settling this question. But Mr. Thomas is not out for direct action in this matter; he prefers constitutional lines. If, however, the Special Congress decides, if the Government stands firm, to have a national stoppage to attempt to coerce the nation's elected representatives, and to enforce as a beginning the nationalization of the mines, then Mr. Thomas will be in a dilemma. For this is a political question; and a stoppage would be direct action. Mr. Smillie professes that he does not like the idea of a national stoppage; but we fancy from the minatory indications in his speech that he would regard even this as a justification to secure the transference of the mines from private ownership to national. We hope that trouble will be averted. It must not, however, be by sacrificing individual and collective rights and democratic government, or by yielding to dictation. While so hoping, there will be no harm in taking thought, and as far as possible action, in preparation for the morrow. Such action as is possible, in present circumstances, is of a somewhat meagre order.

Referring briefly and more particularly to the subject of direct action, there will, of course, be differences of opinion as to what constitutes a political question. We maintain that "nationalization"—the term itself proves it—is a political question, and not solely an industrial one. During last week there appeared to be an evident disinclination on the part of the extremists to obtain the feeling of the Congress on this matter, though the opportunity was offered to them. On Tuesday, Mr. Smillie secured a majority to a motion which expressed the opinion that the Parliamentary Committee should have called together the trade unions to discuss the question of taking direct action on political questions; but there was then no definite declaration of favour on his part to such a policy. On Thursday, Mr. T. Shaw, Labour Member for Preston, supplied the direct actionists with an opportunity of testing their strength, by submitting a resolution declaring against the principle of direct action. This received strong support from Mr. Thomas; but avowed direct actionists moved and seconded the previous question. On a card vote, this was carried by 2,255,000 to 2,086,000. And so again a way was found for avoiding a pronouncement of policy in this respect, though Mr. Smillie has since declared that the miners were in opposition to the motion, and were not averse to a vote being there and then taken.

Improvement in Coal Output.

There is an obvious attempt—we hope it will be sustained—on the part of the collieries and the miners to wipe-out the bad impression that has been made throughout the country by the poor outputs since the seven-hour day came into operation, and which poor outputs found bottom-level in the Bank Holiday week ending Aug. 9. The production then was 2,642,895 tons. In the week ending Aug. 30, it was 4,354,983 tons. The week ending July 12 was the last full one before the seven-hour day came into operation; and we have to go back to that week to find a production in excess of the week ending Aug. 30. The production was then 4,796,148 tons. The miners are therefore now showing what they can do if they like. And there is room for effort on their part. We showed on p. 497 of our issue for Sept. 2, the losses of output in the South Wales and Monmouthshire area through avoidable absenteeism; and now an official statement published towards the end of last week shows that, in Northumberland from Jan. 4 and Aug. 9 this year, the coal production estimated to have been lost by avoidable absenteeism was 547,360 tons, and in Durham between the same dates 1,285,045 tons.

Suspension of the Coal Transport Reorganization Scheme.

The scheme of coal transport reorganization upon which the late Sir Guy Calthrop placed so much faith must have been a great disappointment to him. The grand claim was made that it would result in a saving of railway transport of not less than 700 million ton-miles annually. We know that the scheme had to be amended in many directions, and never have there been any figures published to show that the scheme had justified itself. From this fact alone one may declare with some assurance that it did not do so, although we should be very glad now that the scheme has been suspended, to know that the vast work, machinery, and disorganization which it necessitated and occasioned were not all waste, but that there was some economic advantage. The scheme never met with the approval of the collieries, nor of large buyers, upon the latter of whom an immense uneconomy was imposed by additional conveyance costs and the delivery of unsuitable coal for their purposes. The gas industry suffered enormously in this way. This aspect of the matter was sunk and ignored in the quest for ton-mile savings. At any time, administrators of gas undertakings would be unworthy of the trust reposed in them if they did not buy from the nearest markets, consistent with the quality of coal that they required for their special purposes of making gas, coke, and liquid and other products. They had coal delivered to them which should have been put under steam-boilers, or into domestic fire-grates; and consequently incalculable loss resulted. The suspension of the scheme will not have any immediate substantial effect for gas undertakings whose contracts were made earlier in the year, or for those who have been turned over against their will from railborne to seaborne coal. Freedom in conveyance as well as freedom in the selection of the area of supply is what is wanted today; and then and only then will justice be done in this matter. It will be seen from a report in later columns that the matter of seaborne coal to those southern gas undertakings where railborne coal is financially and practically better, has been attacked at all points by the Central Executive Board of the National Gas Council. The Coal Controller, the Shipping Controller, and the Board of Trade have been interviewed, with so far no effect. Plenty of expressions of sympathy are heard; but it is sympathy of the practical order that is required.

Meter and Stove Rentals and Prices.

"The Public and the Gas Industry" was the title of an article that appeared in the "JOURNAL" for Sept. 2, in which comment was made upon the current controversial points as to rentals and prices of meters and stoves. Following up what was then said, it will be seen, from the minutes of the Central Executive Board of the National Gas Council, that the Sub-Committee who have been considering the question of the hire charges of gas appliances have reported that an increase of 50 p.ct. is quite justified. As to prices, it will be seen that the Society of British Gas Industries show a desire to be quite open in the matter, and to discuss costs in detail. A good spirit and confidence are shown here. Naturally we should like to see prices come down, and very considerably, in the interests of the whole industry. But if investigation vindicates current prices, then the industry must see whether by co-operation something cannot be done to curtail prices by perhaps engaging for a time in bulk production of only standard patterns. However, a Joint Standing Committee is to be formed, from which two Sub-Committees will be appointed—one to deal with stoves, and the other with meters.

"Householders' Burdens."

We do not know the precise object of the "Daily Telegraph" in publishing a series of three articles headed "Householders' Burdens," which deal only with returns relating to rates and the prices of gas and electricity in the London boroughs and outside districts. Householders' burdens in these times are constituted of a great deal more than these items. We cannot see what has been gained by this publication so far as gas is concerned. The figures show considerable variation between different concerns in the upward movement of the charges for electricity; but the charges for gas are more uniform—the supply being in the hands of fewer concerns. In this matter, there is a difference between gas and electricity undertakings which is not recognized in the articles. The fundamental causes of increased prices—coal and other materials and labour—are the same. But up to maximum prices, the municipal electricity undertakings can charge with a view to securing a balance of profit; and electricity companies can charge with a view to the shareholders suffering as little as possible. In the case of gas companies, it is to their advantage to put up the price as little as they can, as with minimum dividends of 3 or 2⅝ p.ct. (which most of the investors are now getting, and it is a scandal), it is to their advantage to reduce the price in order to obtain, under the sliding-scale, something above the minima. But much to their regret they cannot make a

reduction, owing to outside causes. Gas consumers who are not gas investors are no doubt glad that they are not in present circumstances, though it is hoped that the day of relief from gross injustice is not far distant.

Firm Prices for Castings and Pipes.

The credit which we gave in our issue of Aug. 26 to the Stanton Iron Works Company, Ltd., for quoting firm prices for castings and pipes stands good; but it appears that they have not an exclusive right to the credit. It is shared by others. One communication informs us that the practice just adopted by the firm in question is by no means new, as numerous concerns in the same district have for some time past been quoting fixed prices for pig iron without any conditional clause whatsoever. Furthermore (the same letter says) the statement as regards non-increase in the price of castings is rather misleading, as the decision was one come to by the founders of the country as a body, and is in no way peculiar to the Stanton Company. We are glad to hear it.

PERSONAL.

To permit of arrangements being made for the appointment of his successor, and the re-staffing of the Glasgow Corporation Gas Department to be carried out, Mr. ALEXANDER WILSON has agreed not to retire until the end of October from the position of Engineer and General Manager.

Mr. ALFRED WRIGHT, previously with Messrs. C. & W. Walker, of Donnington, who some time ago went out to Australia, has joined Mr. J. C. Alexander, at Bull's Chambers, Moore Street, Sydney, in his gas engineering practice. Mr. Wright has many friends in the gas industry at home, to whom this item of news will be of interest.

Mr. JOHN T. JOYCE, the Assistant Engineer and Manager of the Ilford Gas Company, has been appointed Engineer and Manager of the Weymouth Consumers' Gas Company, in succession to Mr, Lane.

Mr. THOS. WEBSTER SMITH, Assistant Manager at the Heywood Corporation Gas-Works, has been appointed Manager and Secretary to the Whitworth Vale Gas Company, in succession to Mr. H. C. Handley, who has been appointed Gas Engineer and Manager at Denton.

OBITUARY.

The death occurred on the 9th inst. of Mr. CHARLES JOHN GLADWELL, O.B.E., the Chief Accountant of the Imperial Continental Gas Association. Mr. Gladwell entered the service of the Association, in the general office, in 1890, at the age of 25. By his conspicuous ability, he soon proved himself worthy of promotion; and he was advanced from time to time until, in 1906, having a genius for accounts, he was transferred to the accountants' department. In 1909, on the retirement of Mr. Phillips after fifty years' service, the Board appointed him Chief Accountant, in which difficult position he fully justified the confidence and esteem of the Dtrectors. Shortly after the outbreak of war, his services were utilized by the Government in the War Trade Department, where he soon made his mark, and was honoured by the bestowal of the O.B.E.—finally being transferred to the Sugar Commission as their Secretary. It was clear to those about him, on his return to duty with the Association last February, that, never of robust health, the strain of his four years' war work had told upon him; and in May last the Board granted him leave of absence, in order to recuperate. Unfortunately, the seeds of illness were sown too deep; and he has now passed away at the early age of 54, deeply regretted by the Board and his colleagues, who knew and highly appreciated his many good qualities. Mr. Gladwell has left a widow and one daughter, for whom the Board have made suitable provision.

The death took place on the 11th inst., at Brompton (Chatham), of Mr. EDWIN SMITH, who was formerly Secretary to the Birmingham Corporation Gas Department. He was 79 years of age.

The date arranged for the autumn meeting of the Midland Association of Gas Engineers and Managers is Thursday, Oct. 9—at the Grand Hotel, Birmingham.

The marriage has just taken place at Derby of Miss May Wilkinson and Mr. James Waldron Swan, the Manager of the Hitchin Gas-Works, whose parents reside at Derby.

There will be a meeting at Aberavon on Wednesday of next week of the Wales and Monmouthshire District Institution of Gas Engineers and Managers. The President Elect (Mr. A. J. Bond) will deliver his address; and a discussion on "Office Organization" will be started by Mr. W. C. Jackson, of Neath. Some works in the district will also be visited.

NATIONAL GAS COUNCIL—CENTRAL EXECUTIVE BOARD.

Official Minutes.

A MEETING of the Central Executive Board of the National Gas Council was held last Tuesday, presided over by Mr. D. MILNE WATSON.

Reference was made to the Coal Controller's Order of July 11 compelling a certain number of gas undertakings situated in the Eastern, Southern, and South-Western areas to take seaborne Durham coal at an enhanced freight, in lieu of their accustomed supplies of Yorkshire railborne coal. The Chairman recapitulated the various efforts made by the Council with the Coal Controller, the Shipping Controller, and the Board of Trade, with a view to getting the Order revoked, but all of which had hitherto proved unavailing. The feeling of dissatisfaction in the gas industry was further aggravated by the fact that the Government had granted a subsidy to coal merchants on supplies for domestic consumption only, whereas gas undertakings had to pay the full additional cost. The gas industry felt very sore about the unfair treatment meted-out to them. After lengthy correspondence, the Council had received a notification from the Coal Mines Department that the subsidy had been discontinued.

A further result of the Coal Controller's instruction was that undertakings were called upon to handle much larger quantities than they conveniently could at one time; so that transport (instead of being aided) was hindered, and a congested state of affairs on steamers and at the docks was the consequence.

The Chairman then turned to the subject of the financial hardships which the gas industry had been called upon to suffer—in excess, it was contended, of any other industry, as gas undertakings were bound by pre-war legislation to conditions which, with the changed circumstances around them, were threatening them with financial ruin, and in the case of some of the smaller works with extinction altogether.

The meeting was of opinion that the industry was entitled to ask for legislation that would secure to them a pre-war dividend. The matter is being dealt with by a Sub-Committee. Repeated interviews had taken place with the Board of Trade, and there was every reason to hope that before long the gas industry would be placed on a better footing than at present. Before considering the promotion of Bills of their own, which was understood to be the intention of certain undertakings that had been specially hard-hit, the Chairman strongly advised them to give the authorities a chance of proving their good intentions.

Touching upon the report of Sir George Beilby's Committee, the meeting was unanimous in its opinion that this could not be accepted in its entirety, and that a greater latitude than 12 p.ct. must be allowed in the matter of inerts. Representations to this end had already been made to the authorities, who had received them with sympathy.

The meeting decided that the Board of Trade be urged to make known as speedily as possible the steps they proposed to take with regard to the financial hardships and other difficulties under which the gas industry labours, in order that gas undertakings generally may be spared the cost and time involved in preparing and introducing measures dealing with their own special difficulties.

Referring to the report of the Federation of British Industries on the Nationalization of Mines, the Council protested against the findings of the Federation on the subject of profit-sharing and employee-directors.

The Sub-Committee that had been appointed by the Council to discuss the question of increasing the hire-charges of gas appliances in view of the increased cost of materials, had reported that an increase of at least 50 p.ct. in the rental charges of existing stoves and cookers was quite justified.

The Chairman reported that, at a meeting of the Sub-Committee of the Council with the Society of British Gas Industries, on the question of the high prices of stoves, meters, &c., the Society had expressed a wish to discuss the matter of costs in detail. They had been asked by the Council to nominate twelve members to form a Joint Standing Committee with representatives of the Council. This Joint Standing Committee would elect from among its members two Sub-Committees to deal with stoves and meters respectively.

It was reported that the British Commercial Gas Association had taken up with Dr. Addison the question of gas supply in relation to new building schemes.

The Chairman reported that the Home Office Committee on Workmen's Compensation had requested that a representative of the Council should give oral evidence before them on Oct. 8 on the subject of the Workmen's Compensation Act.

It was agreed that the sum of £25 per annum be handed over to each District Executive Board for allocation as they may determine, in recognition of clerical work performed for the District Board.

It was agreed that the Finance Committee be asked to make a donation—if possible of £1000—to the Gas Investigation Committee of the Institution of Gas Engineers.

The date for the next Annual General Meeting of the Council was fixed for Tuesday, Dec. 9.

EX-ARMY MEN NOT SO FAR PLACED BY THE GAS INSTITUTION DEMOBILIZATION COMMITTEE.

A List of Seven Good Men Wanting Positions.

UNDER date of the 11th inst., Mr. R. G. Shadbolt, the Chairman of the Demobilization Committee of the Institution of Gas Engineers, forwards for publication in the "JOURNAL" the following "outline indication of the qualifications of the 'cases' still on the list as 'unplaced,' in the hope that such publication may lead to the speedier settlement of these men in suitable posts."

Inquiries into any of the cases may be made either through Mr. Dunn, the Secretary of the Institution, or through Mr. Shadbolt himself.

1. Candidate eminently suitable for the post of engineering assistant to any engineer and manager of a large works, or as engineer and manager of medium works.

Age. 45 years.
Education. At a High School in the North of England, taking scholarship, Cambridge Local Examination, and matriculating.
Technical training. With a well-known North of England engineering firm as draughtsman, and practical training.
Gas-works appointments. As assistant with three different large North of England gas undertakings, and one important undertaking in Canada. He returned to England in 1916.
War-time experience. Chemical and explosives at three different munition works.
Credentials. Has excellent testimonials and references, and is personally known to a number of leading gas engineers. Is at liberty to take up duties immediately.

2. Candidate suitable for the post of either engineer and manager, or assistant engineer and manager of small or medium sized works.

Age. 28.
Education. Good general.
Technical training, &c. Pupil and assistant to a well-known engineer and manager of medium-sized works in the Midlands, followed by assistantship in similar sized post in Yorkshire, up to the time of joining the forces.
Present position. Lieutenant in machine gun corps, awaiting demobilization.
Requirements. Wishes to resume in similar position to that vacated.
Credentials. Personal and technical are both good.

3. Candidate suitable for the post of chief technical assistant in good-sized works.

Age. 27.
Education. Good general and technical.
Technical Training. Good all-round — including chemistry, draughtsmanship, and constructional work.
Experience. Good all-round; and at time of joining the forces was chief technical assistant in a good sized works in South of England.
War service. In R.N.A.S., and then in R.A.F.
Requirement. Similar post to that vacated,
Credentials. Good, both personal and technical. Is at liberty, and awaiting appointment which he could take up at once.

4. Candidate open to take appointment at home or abroad. Good knowledge of French and a little of German. Would accept either chief's or assistant's post.

Education. Good general and technical.
Technical training. All-round. Holds first-class certificates in "Gas Engineering," "Gas Manufacture and Distribution," and "Inorganic Chemistry. Good laboratory experience.
Appointment held. Technical assistant to a London consulting engineer.
Requirements. Almost any post of technical or responsible character.
War experience on three fronts. At liberty to take up duties at once
Credentials. Good.

5. Candidate suitable for the post of engineer, manager, and secretary of a 50 to 100 million works.

Age. Not given.
Education. Good general and practical.
Technical training. Good all-round, and has had experience in all departments of a gas undertaking.
Experience. Technical and practical.
Appointment. Three years working manager at a medium-sized works in the North of England—a position permanently filled while in the army.
War service. Two-and-a-half years in mechanical transport, R.A.S.C.
Requirements. Responsible post in medium-sized undertaking. Is at liberty, and could take up duties at once.
Credentials. All good.

6. Candidate suitable for manager of small works, or erector or fitter on any sized works.

Age. Not stated; but young.
Education. Good general and practical.
Training. Varied and practical; fitting and erecting, &c.
Appointments. Varied in gas-works, and finally erector with firm of gas engineering contractors, up to joining army.
War service. Of general character.
Requirements. Almost any post as fitter or erector, or manager of a small works. Could take up duties at once.
References. Good.

7. Candidate suitable for a post where he can complete the practical part of his training as a gas engineer under the Government scheme for assisting demobilized officers.

Age. About 28. Son of a well-known gas engineer, deceased.
Education. Good, both general and technical. Has taken first-class "Honours" in both Senior and Junior Cambridge Locals, and has passed the "Intermediate" examination for B.Sc., Birmingham.
Training. Owing to domestic affairs, had to abandon University training, and took up scholastic work, which he left to join the forces.
War service. Infantry and machine gun corps; finishing as Lieutenant.
Credentials. Good.
Requirements. Post as pupil to complete training as gas engineer and manager, preferably in neighbourhood of London, and in works with re-construction work going on, and with a view if possible to following-on as an assistant. Awaiting an opening, and could commence at once.

Practical Method of Carbonizing Coal at Low Temperatures.

This was the title of an article that recently appeared in the "Berichte," Vol. LII., pp. 1035-39, from the pen of Herrn. F. Fischer and W. Gluud. It was abstracted in the current issue of the "Journal of the Society of Chemical Industry." It is pointed out that difficulties are encountered in carbonizing considerable quantities of coal at low temperatures in a reasonable time, since (owing to the low thermal conductivity of the material) the heat penetrates so slowly into the interior of the charge that the outer portions readily become overheated. The authors consider that the conditions essential for success are that the volatile portions should not be heated to a temperature higher than that which is necessary for their volatilization, and that they should not be exposed to this temperature for an unnecessarily long period. They have constructed a cylindrical retort which can be rotated about a horizontal axis. The latter is hollow, but is plugged in the middle. Through one end steam is admitted; and this carries off the volatile products through the other end to a condensing arrangement. The furnace is heated from underneath by a series of gas-burners fed with air under pressure; while loss of heat is minimized by enclosing the furnace in a metal sheath. A thermocouple is placed in the axis. The furnace permits the distillation of 20 kilos. of coal in from one to two hours. Distillation generally commences at about 350° C. and is complete at 500° C. The yield of tar is from 3 to 30 p.ct., according to the kind of coal used. The first portions of the oils are lighter than water, and the last portions are heavier—the mean density being slightly greater than unity. In thin layers, the tar forms a golden-red oil which is more or less viscous according to the kind of coal used.

Colloidal Fuels.

Earlier this year there was issued by the Executive Committee of the Submarine Defence Association of New York, a report by Mr. Lindon W. Bates concerning new colloidal fuels developed under their auspices, and fully tested and demonstrated. He has now prepared another statement, setting out the relation of these fuels to coal, to the production of power and heat, and to fire prevention and insurance. Though, he says, the ultimate future is for coal, since oil is relatively short-lived, at the present time all the coal that can be mined and all the oil that may be won are needed. Each should support the other; and to accomplish this support and union have come colloidal fuels. They are coal in liquid guise; being composed of myriads of microscopic and ultra-microscopic coal particles habited in oil. Up to over 40 p.ct. by weight of coal and 59 p.ct. oil, colloidal fuels are liquid. As the coal percentage is increased, the composite passes through denser stages, from a thin mixture into thicker, but non-sticky, mobile pastes, that are movable under well-directed pressure—pumpable and atomizable up to over 65 p.ct. of coal content. For steam raising and melting and moulding metals, colloidal fuel possesses the most unique power that ever was vouchsafed to solve a physical and financial problem. It can save the coal-pile, and increase from 25 to 75 p.ct. the thermal value of the tonnage. It does this by, in effect, fluidizing a solid. These fuels are vapourless, and thus create no explosive mixture with air; and they are immune to spontaneous combustion. A typical bituminous colloidal fuel contains 160,000 B.Th.U. per gallon, or 1,196,880 B.Th.U. per cubic foot, and may be made with anthracite and cokes up to 1,346,490 B.Th.U. per cubic foot.

British Refractories Research Association.—The Department of Scientific and Industrial Research have approved the Memorandum and Articles of the British Refractories Research Association which are now under consideration by the Board of Trade. Mr. A. C. Rann, No. 14, Great George Street, Westminster, S.W. 1, will act as Secretary of the Association.

STATUTORY UNDERTAKINGS (TEMPORARY INCREASE OF CHARGES) ACT, 1918.

Further Applications and Orders.

THE following is a further list of applications under the Act received by the Ministry of Health.

Chard Town Council.
Knaresborough Urban District Council.
Neyland Urban District Council.
Scunthorpe Urban District Council.

Orders have been made by the Ministry of Health authorizing the Accrington District Gas and Water Board to increase the price of gas from 4s. to 6s. per 1000 c.ft., the Loughborough Corporation from 3s. 6d. within the borough to 5s. 3d. per 1000 c.ft.' and the Smethwick Corporation from 4s. to 5s. per 1000 c.ft.

ELECTRICITY SUPPLY MEMORANDA.

HEATING water electrically is being revived. Our old friend Mr. C. Orme Bastian has been trying his hand at it, and has found that it takes 1 B.Th.U. to raise 1 lb. of water 1° Fahr., that 1 electrical unit is only capable of developing 3420 B.Th.U., that it will not do to claim for heating water electrically 100 p.ct. efficiency, as one might be found out, and that there are other people besides Mr. Bastian who know that one cannot let water trickle through a heating device, and be heated to 150° Fahr., and then flow into a receptacle—lagged or unlagged—without losing heat. The tank that Mr. Bastian has designed is simply of bright copper unlagged—a substance with which the gas industry has had prodigious experience, and therefore knows that it will not retain heat any more perfectly for Mr. Bastian than it will do for other people. The "Electrical Times" states that one important feature of the new electric water-heater is that the water always enters the heater in a trickle; there is never a flush of cold water; but there is a long interval of time during which it is brought up to a temperature of 150° by the small heating element employed, using 150 watts per hour with the water feeding into a 10-gallon tank. The trickling process therefore proceeds at the rate of less than ½ gallon per hour; and so a family of seven would have to be content with per week one bath of 10 gallons of hot water mixed with 5 gallons of cold, unless they applied the supplementary bath-room heater, the electricity used by which would have to be charged for at the ordinary rate! [The lighting scale?] The ingenuity of the electrical men recognizes no limits. However, about the heating part of this wonderful piece of work. The "Electrician" tells us, in rather more stately style, something more about the heating element. "Success," we read, "in heating water electrically is admittedly mainly dependent on the design of the tank and heating surfaces; and it is claimed that in the Bastian apparatus, wherein the ratio of surface area to capacity is reduced to a minimum, and the cylinder is relatively large, the process is remarkably efficient." We suggest that "success" includes economy; and electrical heating of water cannot really justify itself on the score of cost, or of coal, or of time. We will not dip deeply just now into the average expenditure of coal necessary to generate a unit of electricity, which is only capable of giving 3420 B.Th.U., upon which Mr. Bastian has not the courage to claim more than 82 p.ct. efficiency, or about 2800 B.Th.U., which is 5·6 p.ct. efficiency based upon the original consumption of coal—taking the average coal expenditure for the generating stations of the country. The work that Mr. Bastian's heater does (allowing the current to trickle in at the rate of 150 watts per hour, and the water to pass through in a thread-like stream) is to provide, as mentioned above, 10 gallons of water at a temperature of 150° Fahr.; the expenditure of current per day being 3·6 units, or per week 25·2 units. This, he thinks, ought not to be charged at more than 0·75d. per unit; and so the cost per week for 70 gallons of water would be 18·9d., which is 2·7d. per 10 gallons, which is dear, besides the inconvenience of having to wait twenty-four hours for a full 10 gallons of water at a temperature of 150°. The apparatus is also made in twenty and forty gallon sizes, with consumption and costs in proportion.

Trickling Water.

Gas and Efficiency.

The gas industry is not a bit afraid of competing for water heating upon the terms suggested by Mr. Bastian's figures. Householders, who are accustomed to heating water promptly and cheaply by gas, will smile at the idea of paying 2·7d. for heating 10 gallons to 150°, and if they exhaust 10 gallons from the tank, of having to wait another twenty-four hours before a further 10 gallons at 150° can be ready for use. The "Electrical Times" says: "While it may be true that, by means of gas, some 70 p.ct. of the original heat of the coal is delivered to the consumer, it is a fact that the consumer can seldom utilize the gas that he purchases without wasting an enormously high percentage of the heat from the gas-flame." This brilliant performance is beyond the truth; and it shows the little knowledge of these heating questions possessed by some electrical writers. How can 70 p.ct. of the heat of the coal be delivered as gas to consumers, when the coal yields coke and tar besides gas, and there is available for sale (according to the coal and the manufacturing process employed) 8 to 10 cwt. of coke, representing something well on the road to 50 p.ct. of the original calorific value of the coal? There are some advanced works now making a volume of gas per ton representing about one-third of the heating value of the coal. When one compares this with the 1½ p.ct. to 8 or 9 p.ct. (or the average of rather more than 5 p.ct.) efficiency of the electrical industry, there is a remarkable margin of efficiency between gas and electricity which can carry all the waste of heat that there actually is, and yield a balance of economy which leaves electricity far behind, and ridicules such cheap and loose assertions as "it is a case of losing more on the roundabouts than is gained on the swings."

Cost, Convenience, and Copper.

Again we read that theoretically one should secure equally good results with 25 c.ft. of gas costing 1·2d. at 4s. per 1000 c.ft.; but, in practice, the convection losses from the gas-flame bring the cost up to a much higher figure than would ever be anticipated. No one claims for water-heating by gas 100 p.ct. efficiency. But we can depart from test results, and give some practical experience with a gas-geyser, which Mr. Bastian will not be able to match with his electrical apparatus. The geyser in question, properly fitted with a ventilating-pipe, is in a bath-room; and frequently by its aid three or four people have hot baths within an hour, at an average cost of 1d. per person—the price of gas having been, or was until lately, 4s. The water passes direct through the heating element in the geyser into the bath—steaming; and in five minutes the first bath is ready. There is no radiation, convection, or conduction losses from tank storage, because tank storage is not needed. How long would these three or four persons have to wait for their baths with Mr. Bastian's marvellous apparatus, and what would be the relative cost? Then another piece of piffle by the same electrical writer. He says: "Even if gas were able to show a good case on a purely thermal basis, it is put out of court by the furious appetite with which it devours copper." Now the geyser that has already been referred to was fixed some time before the war. It has a copper body, and has had hard use since. Though no one can complain of its efficiency and excellent service, perhaps now both might be improved by a little internal attention. Never since it was fixed has it had a penny spent upon it for repairs, and the copper has not been "devoured" by the gas. Why is this, if the "Electrical Times" is right? When electrical men deal with gas matters, they would perhaps save themselves a lot of ridicule if, before making loose statements of the kind, they would ask themselves what practical experience has to say to what they are about to put on paper. Reverting to the subject of cost, we have pointed out that, with a Bastian water-heater, the consumption of electricity is a constant quantity. Therefore, if the current for this purpose passes through the ordinary meter, the fixed amount used for water heating can be deducted from the total units registered, and be charged at the special rate. Where, however, a supplementary heater is used for baths, the current has to be charged out at the ordinary rate. Thus, baths would cost a goodly sum in these days of high "ordinary" rates for electric current. Mr. Bastian has not made us afraid that domestic water heating is going to be transferred from gas (or coke) to electricity. Economy in money and time will continue to prevail where sanity and impartiality reside.

Desirable Loads and Tariffs.

Electricity tariffs are supplying the "Electrical Times" with material for discussion. It is a good subject upon which to fall back when other things are a bit flat. Our contemporary has resurrected Dr. John Hopkinson's classical contribution to the consideration of the conditions governing electrical cost. But there are some electrical men who want to get away from the medley of tariffs which have been designed to serve the electricity undertaking, and have largely resulted in confusing the public. Mr. W. Fennell, of Northwich, is one of those who pray that there may be no further confusing of an already bemuddled public; and he advocates tariff simplicity. The greater interest in his letter is found in his frank confessions as to the classes of household business he considers are good from the point of view of the supplier—not from that of the householder. He does not discuss efficiencies, coal conservation, economy, or any of the things that matter in contributing to the securing of business, and to the interests of the nation, but just marks out the plots of business that he would like to have for his undertaking. He speaks of the "wrecked remains" of the lighting on the maximum-demand system, with a very greatly lessened unit output; and there is the power load, in Mr. Fennell's case for the most part coinciding with the lighting peak. There is the possibility of improving the lighting load by adding the workman's cottage demand, the maximum of which will not coincide with the works load. He thinks this could be obtained under the housing schemes by dealing with blocks of houses, where service costs may be low and supervision easy. Here, it is thought, the water company's contract system could be borrowed with good results, and a saving of capital. From the point of view of Mr. Fennell, heating is doubtful. Its incidence generally coincides with lighting; and it provides little, if any, summer load. It certainly cannot profitably be supplied at less than power rates. Few undertakings can afford to supply at less than £10 per KW. of peak

maximum demand, *plus* 0·75d. per unit; and so most consumers will object to a bill for a 3 KW. radiator. If, as is usual, the radiator is used between 4 and 6 p.m. in the winter months, the undertaking must have a good rate, *plus* the unit charge, to make both ends meet. In workmen's cottages, the cooking load would be off-peak, because it is shrewdly anticipated that the electric cooker would only be used when the workman had not a coal-fire in use. Suburban cooking he does not regard as so favourable, because there is a tendency to substitute the stove for the kitchen fire even in the winter. Still, in Mr. Fennell's case, he believes cooking as a business proposition is many miles ahead of heating. Its use would be at least equal in summer to that in winter; and therefore lower rates should be offered for it than for heating.

From the Point of View of the Undertaking.

Thus Mr. Fennell arrives at the conclusion that the problem that has to be solved is the provision of a suitable tariff to encourage desirable classes of load, as it is apparent that "desirable" classes of load vary with the conditions of an undertaking, so that each undertaking must determine for itself how it is to capture that which is most "desirable." Here comes in the beauty in the commercial position of having a gasholder upon the stock in which one can draw for any purpose at any time, no matter whether it be the time of peak load or otherwise; no matter whether it be summer or winter. It is the balancer of business—the means by which production can be made uniform, whether or not there are sharp changes in the consumption curve. But we think Mr. Fennell will have some difficulty in cultivating the lighting load in workmen's cottages to be of any real advantage to the undertaking. And cooking in workmen's cottages is also a doubtful proposition, quite apart from the initial cost and maintenance. Initial cost is not what it was. Electrical appliances cannot help being a long distance ahead of gas appliances in their cost in position and ready for use; and the proportional difference has been maintained with ascending costs. As to maintenance, it is found that with gas appliances, it is necessary to have something that can stand hard wear. Electrical appliances require delicate handling and their operation great refinement, in order to make the heat generated go as far as possible, and thus keep costs down to the minimum. Householders of the working class need something that is not too great a strain on them in this regard. They have neither the time nor the inclination for extreme precision. Evidently Mr. Fennell's view is that suburban (by which he apparently means middle-class) electric cooking is not so desirable as that of the working class, because the people would overdo the use of the electric-stove by employing it not only in summer but in winter, when the load is the heaviest. This is very funny. The matter is looked at from only the point of view of the undertaking, and not from that of the consumer. According to electrical teachings and no others, electrically cooked food should always be the order of things, on account of its alleged unapproachable nutritious virtues, and its capacity for "saving meat." These are temptations to adopt electric cooking; but Mr. Fennell has to remember the financial interests of his undertaking.

Death in the Bath.

There would not be any necessity to refer to the death of Mr. W. H. Eckersley, a cotton spinner of Leigh, were it not that he died from asphyxiation caused by paralysis of the heart through an electric shock. There is an extending line of deaths attributable to electric shock; but the special point about this fatal occurrence is that the pressure was the low one of 100 volts. It was formerly promulgated abroad that it was impossible for deaths to take place at the ordinary supply voltages of (say) 200 to 240. But the incontestable evidence of death itself proved that the promulgation has no place in the region of truth. The evidence is too great to be set aside as unreliable. Now we have this case, and the pressure was only 100 volts. Mr. Eckersley used an electric vibrator as a remedy for rheumatism. An electric vibrator is a small electric motor enclosed in an aluminium case, with a handle of the same metal, and in the handle a switch for controlling the machine. The vibrator was connected with the bathroom light by a long flexible cord and adapter. The machine was found to be faulty; the wire at one point being bare and green, owing to dampness and electrolytic action, making the case alive. Mr. Eckersley must have picked up the machine after he had got into the bath, thus providing a passage for the current through his body to the water; and the danger was intensified by the bath being of metal. There should be general warning against the danger of using any such appliances, except under expert supervision; and the public should also be told that even a pressure of 100 volts is not so harmless as many have supposed.

BRITISH ASSOCIATION MEETING AT BOURNEMOUTH.

LAST week the British Association for the Advancement of Science resumed their annual meetings, which have been in abeyance since the gathering at Newcastle in September, 1916. The business was mainly transacted in the Municipal College at Bournemouth, where accommodation was provided for the twelve separate sections. For the Inaugural General Meeting (at which the President, the Hon. Sir Charles Parsons, K.C.B., delivered his address) and some evening discourses the Winter Gardens Pavilion was set apart. By the Monday evening over 1100 members and associates had registered; and it was expected that subsequent arrivals would bring the total number up to between 1300 and 1400.

THE PRESIDENTIAL ADDRESS.

Sir Charles Parsons in his address reviewed the achievements of science before and during the war. Among the matters referred to in connection with developments prior to the war were turbines and the investigation of gaseous explosions. As to these, he said:

TURBINES.

In turbines of 20,000 to 30,000 H.P., 82 p.ct. of the available energy in the steam is now obtainable as brake horse power; and with a boiler efficiency of 85 p.ct., the thermo dynamic efficiency from the fuel to the electrical output of the alternator has reached 23 p.ct., and shortly may reach 28 p.ct.—a result rivalling the efficiency of internal combustion engines worked by producer gas.

During the twenty years immediately preceding the war, turbo generators had increased in size from 500 to 25,000 kilowatts; and the consumption of steam had fallen from 17 lbs. to 10·3 lbs. per KW.-hour. Turbines have become the recognized means of generating electricity from steam on a large scale.

INVESTIGATION OF GASEOUS EXPLOSIONS.

Brief reference must be made—and it will be gratifying to do so—to the important work of one of the Committees of the British Association appointed in 1908, under the chairmanship of the late Sir William Preece, for the investigation of gaseous explosions, with special reference to temperature. The investigations of the Committee are contained in seven yearly reports up to 1914. Of the very important work of the Committee I wish to refer to one investigation in particular, which has proved to be a guiding star to the designers and manufacturers of internal combustion engines in this country. The members of the Committee more directly associated with this particular investigation were Sir Dugald Clerk, Prof. Callendar, and the late Prof. Bertram Hopkinson. The investigation showed that the intensity of the heat radiated by the incandescent gases to the walls of the cylinder of a gas-engine increases with the size of the cylinder; the actual rate of the increase being approximately proportional to the square root of the depth of the radiating incandescent gas. The intensity was also shown to increase rapidly with the richness of the gas. It suffices now to say that the heat in a large cylinder with a rich explosive mixture is so intense that the metal eventually cracks. The investigation shows why this occurs, and by doing so has saved enormous sums to the makers of gas and oil engines in this country, and has led them to avoid the large cylinder, so common in Germany before the war, in favour of a multiplicity of smaller cylinders.

On the subject of electricity, he said that at the end of last year the central electric stations in the United Kingdom contained plant aggregating 2¾ million kilowatts, 79 p.ct. of which was driven by means of steam-turbines. Speaking about the future, he made the following remarks.

WATER-POWER AND COAL.

The amount of available water power in the British Isles is very small as compared with the total in other countries. According to the latest estimates, the total in the British Isles is under 1½ million horse-power; whereas Canada alone possesses over 20 millions, of which over 2 million have already been harnessed. In the rest of the British Empire there are upwards of 30 millions, and in the remainder of the world at least 150 millions; so that England herself possesses less than 1 p.ct. of the water power of the world. Further, it has been estimated that she only possesses 2½ p.ct. of the whole coal of the world.

England owes her modern greatness to the early development of her coal. Upon it she must continue to depend almost exclusively for her heat and source of power, including that required for propelling her vast mercantile marine. Nevertheless, she is using up her resources in coal much more rapidly than most other countries are consuming theirs; and long before any near approach to exhaustion is reached, her richer seams will have become impoverished, and the cost of mining so much increased that, given cheap transport, it might pay her better to import coal from richer fields of almost limitless extent belonging to foreign countries, and workable at a much lower cost than her own.

Let us endeavour to arrive at some approximate estimate of the economic value of the principal sources of power. The present

average value of the royalties on coal in England is about 6d. per ton; but to this must be added the profit derived from mining operations after paying royalties and providing for interest on the capital expended and for its redemption as wasting capital. After consultation with several leading experts in these matters, I have come to the conclusion that about 1s. per ton represents the pre-war market value of coal in the seams in England.

It must, however, be remembered that, in addition, coal has considerable value as a national asset; for on it depends the prosperity of the great industrial interests of the country, which contribute a large portion of the wealth and revenue. From this point of view, the present value of unmined coal seems not to have been sufficiently appreciated in the past, and in future it should be better appraised at its true value to the nation.

This question may be viewed from another aspect, by making a comparison of the cost of producing a given amount of electrical power from coal and from water power. Assuming that 1 H.P. of electrical energy maintained for one year had a pre-war value of £5, and that it requires about 8 tons of average coal to produce it, we arrive at the price of 6s. 3d. per ton—*i.e.*, crediting the coal with half the cost. The capital required to mine 8 tons of coal a year in England is difficult to estimate; but it may be taken approximately to be £5, and the capital for the plant and machinery to convert it into electricity at £10, making a total of £15. In the case of water power, the average capital cost on the above basis is £40, including water rights (though in exceptionally favoured districts much lower costs are recorded). From these figures it appears that the average capital required to produce electrical power from coal is less than half the amount that is required in the case of water power. The running costs, however, in connection with water power are much less than those in respect of coal.

Dowling has estimated the total coal of the world as over seven million million tons; and whether we appraise it at 1s. or more per ton, its present and prospective value is prodigious.

In some foreign countries the capital costs of mining are far below the figures I have taken; and, as coal is transportable long distances and, generally speaking, electricity is not so at present, it seems probable that capital will in the immediate future flow in increasing quantity to mining operations in foreign countries, rather than to the development of, at any rate the more difficult and more costly, water power schemes. When, however, capital becomes more plentiful, the lower running costs of water power will prevail, with the result that water power will then be rapidly developed.

As to the possible new sources of power, the President recalled that in his address to the Association in 1904 he discussed the question of sinking a shaft to a depth of 12 miles, which is about ten times the depth of any shaft in existence. The estimated cost was £5,000,000, and the time required about 85 years.

Pacific Coast Gas Association.—This week the 26th annual convention of the Association is taking place at Los Angeles. The business programme is a long one; and the papers prepared for presentation, together with the reports to be given by the Chairmen of the several Standing Committees—particularly those of the Public Policy Committee and the Committees on Legislation and Taxation and the Piping of Buildings for Gas—promise to be of unusual interest for the distribution side of the industry.

Eastern Counties Gas Managers' Association.—As already announced, the half-yearly meeting of the Association is fixed for Wednesday, Oct. 1, in Hall 20, Salisbury House, Finsbury Circus, E.C. (near Liverpool Street station). The retiring President, Mr. H. R. Wimhurst, of Bury St. Edmunds, will take the chair at 2.30; and after some formal business, there will be the induction of Mr. W. W. Townsend, of Colchester, the President for 1919-20. Thereafter papers will be read by Mr. C. E. Wright, of Ipswich, on "Post-War Gas Problems," and by Mr. S. Moore, of Scunthorpe, on "Water Gas and Coal Conservation." The coal position will also be discussed.

Temperature Recorders for Gas-Furnaces.—There is reproduced by "Engineering" from the "Iron Age" a description of the "Falbro" temperature controller—a device for controlling temperatures in gas-furnaces, ovens, lead pots, and other apparatus using gas fuel. It is operated by air pressure, and consists essentially of the controlling instrument of an automatically-operated valve for gas. The controlling mechanism is made up of a galvanometer and an air-motor with clamping mechanism for holding a plate on the galvanometer pointer at intervals of four seconds, when the air is forced through an opening in the plate, thereby causing the valve to operate the gas and air valves so as to regulate combustion. The position of the air and gas valves is determined by the position of the galvanometer pointer. The needle of the galvanometer, when reaching a point higher or lower than the temperature that has been set, releases the air which operates the valves either to reduce or increase the supply of gas. In order that the instrument may be set to any desired temperature within the range of the scale, an index pointer is provided. A thermocouple placed in the furnace to be controlled is connected with the galvanometer. By this method, temperatures up to 3000° Fahr. can be controlled; but for higher temperatures the radiation system is necessary. It is said that the control does not vary more than 1 p.ct. of the range scale. A multiple control can, it is stated, also be adapted for automatically regulating a furnace having more than one burner.

BRITISH ASSOCIATION FUEL ECONOMY COMMITTEE.

Further Restrictions Suggested for the Gas Industry.

On Friday, the Fuel Economy Committee presented their second report. Of this Committee Prof. W. A. Bone is Chairman, Mr. H. James Yates the Vice-Chairman, and Mr. Robert Mond the Secretary. The first report of the Committee was submitted in 1916.

It was largely through the work of this Committee that the Ministry of Reconstruction appointed what was then known as the Coal Conservation Committee, whose work was taken over and continued by the Department of Scientific and Industrial Research which was subsequently established. Eventually the Department appointed the Fuel Research Board. In these circumstances, the Fuel Economy Committee for a time discontinued their work, and Prof. Bone became Technical Adviser to the Fuel Research Board. Later on he relinquished this position. In October, 1918—in response to a widespread and growing feeling [these words are taken from the present report] that there was need of an organized body of independent scientific opinion that could be brought to bear, in the public interest, on any proposals for research in regard to fuel—the British Association Committee resumed their labours, but in re-organized form.

The reconstituted Committee comprised 30 instead of (as formerly) 45 members; and the number of the Sub-Committees was reduced from five to three, each with its own Chairman and Vice-Chairman, as follows:

—	Number of Members.	Chairman.	Vice-Chairman.
A.—Chemical and Statistical.	12	Prof. Henry Louis	Prof. W. W. Watts
B.—Carbonization and Metallurgical . .	9	Sir Robert Hadfield	Mr. A. Hutchinson
C.—Power	10	Mr. C. H. Wordingham	Mr. W. H. Patchell

Each of the following Societies and Institutions was invited to nominate for co-option (if not already a member) a representative on the Committee, which they did, as follows:

(1) Federation of British Industries .	Mr. A. T. Smith.
(2) Association of British Chemical Manufacturers	Mr. Robert Mond.
(3) Society of Chemical Industry . .	Mr. E. V. Evans.
(4) Institution of Mechanical Engineers	Mr. W. H. Patchell.
(5) Institution of Electrical Engineers	Mr. C. H. Wordingham.
(6) Institution of Mining Engineers .	Mr. G. Blake Walker.
(7) Institution of Mining and Metallurgy	Mr. G. E. Morgans.
(8) Iron and Steel Institute	Sir Robert Hadfield.
(9) Coke Oven Managers' Association	Mr. D. V. Hollingworth.

In addition, Mr. D. H. Helps has continued to represent the Institution of Gas Engineers, and Mr. H. James Yates the Society of British Gas Industries.

Now we have, as already mentioned, the second report of the Committee. In the first place, it deals with coal outputs and prices since 1913; and figures on the lines of many lately published are given which show how the annual output per person employed at the mines has diminished, and how the average pit-head price has ascended. Similar figures to these were included in the Cantor Lectures delivered by Prof. Bone at the Society of Arts last March; and there is therefore no need to reproduce here this portion of the report.

The second section of the report relates to research on the chemistry of coal; and the suggestion is made that there should be organization of existing laboratories for systematic co-operative research, aided by national funds in which all such laboratories may participate. The Committee also regret that, notwithstanding the establishment of the Fuel Research Board, with large funds at their disposal, no attempt has apparently yet been made to organize any such comprehensive scheme as the Committee recommended in 1916. They wish again to impress upon both the public and the Department of Scientific and Industrial Research the danger of sterilizing fuel research by a policy of over-centralization. On the contrary, they are of opinion that what is most needed is a broadly-planned policy, which will aim at stimulating and assisting experimental work on the chemistry of coal, fuel economy, and cognate subjects everywhere throughout the whole kingdom.

There is a short reference to the electric power supply schemes; and then we come to what, for the gas industry, is the most important part of the report. This is given *in extenso*.

Future Standards of Public Gas Supplies.

The Committee have had under consideration the report issued on Jan. 29, 1919, by the Fuel Research Board in reply to the inquiry of the Board of Trade as to "What is the most suitable composition and quality of gas and the minimum pressure at which it should be generally supplied, having regard to the desirability of economy in the use of coal, the adequate recovery of bye-products, and the purposes for which gas is now used."

Recognizing that the said report opened up important and far-reaching questions of public policy with regard to the manufac-

ture and distribution of town's gas, the Executive, after receiving separate memoranda on the subject from Prof. Bone and Mr. E. V. Evans, referred the whole matter for detailed consideration to a Sub-Committee consisting of Sir Robert Hadfield, Prof. Bone, Dr. J. E. Stead, Messrs. A. H. Barker, E. Bury, E. V. Evans, Douglas H. Helps, D. V. Hollingworth, A. Hutchinson, R. Mond, W. H. Patchell, and H. James Yates.

This Sub-Committee having reported that they had arrived, by an eight to one majority, at the conclusions embodied in the following numbered paragraphs, they were formally adopted by the Committee as a whole, and ordered to be incorporated in the report as the findings of the Committee on the subject:

(1) The chief recommendations made by the Fuel Research Board embody substantially the following propositions:

(*a*) That the consumer shall in future be charged according to the thermal units in the gas actually received by him, just a as consumer of electricity is charged for the Board of Trade units which have passed through his meter.

(*b*) That, subject to a maximum limit of 12 p.ct. of inert constituents, and of its undertaking to adjust consumers' lighting, heating, and cooking appliances, so that the gas can be burnt in them with both safety and efficiency, the gas undertaking shall be at liberty to fix the calorific value of the gas it supplies to its customers, although in the common interests of producers and consumers it is suggested that burners shall be standardized for a limited number of calorific values of gas of which (it is suggested) four grades may be sufficient—400, 433, 466, and 500 B.Th.U. per cubic foot.

(*c*) That every supply district above a certain magnitude ought to be provided with one or more gas examiners and, if necessary, a staff of inspectors, whose whole time should be devoted to looking after the interests of gas consumers, and that the smaller supply centres should be grouped into districts for such purposes.

(*d*) That, provided customers' appliances are properly adjusted to the grade of gas supplied, it may be tentatively accepted that the relative values of different grades of gas are strictly proportional to their calorific values. Thus, for example, "the relative values to the consumer of gases of 500 and 400 B.Th.U. could be taken as exactly in that ratio."

(*e*) That there shall be more complete removal of sulphur and cyanogen compounds from the gas.

(*f*) That, under normal conditions of supply and equipment, there shall be a pressure of not less than 2 inches of water in the gas at the exit of the consumer's meter.

Agreement as to Charge on the Heat Unit Basis.

(2) In regard to these recommendations, the Committee generally agree that, provided (*a*) that simple and effective means or apparatus could be devised, and put into general operation, for determining the heat units actually received by each individual gas consumer throughout the kingdom, and (*b*) that certain other conditions (hereinafter set forth) were assured, it would be more equitable to charge the consumer on a basis of "heat units" than on one of "cubic feet" supplied.

Restrictions as to Inerts.

(3) The Committee also agree generally with the Fuel Research Board's recommendations as to (*a*) the maximum limit of 12 p.ct. of inert constituents, and (*b*) the minimum pressure of 2 inches of water in the gas at the exit of the consumer's meter.

Restrictions in the Use of Water Gas.

(4) The Committee considers that it should be the aim of any national policy in regard to gas standards to ensure (*a*) to the consumer, and especially to the domestic consumer, a supply of gas suitable to his requirements at the lowest cost consistent with reasonable safety, and (*b*) to the community at large as great a recovery of valuable bye-products in the carbonizing process as is consistent with the production of a reasonably safe and usable gas. It certainly ought not to exclude the possibility of (*a*) distributing through the public mains surplus coke-oven gas or (*b*) securing, to a safe and reasonable degree, the advantages in regard to reduced costs of production accruing from the modern practice of steaming the incandescent coke produced by carbonizing coal in vertical retorts on the continuous system. It by no means necessarily follows, however, that a gas undertaking ought to convert all its coke into water gas, as some of them apparently would like to do. It might conceivably be better policy to require gas undertakings (at least some of them) to produce and supply the community with (*a*) a straight coal gas obtained simply by carbonizing the coal, and (*b*) a free-burning coke, or semi-coke, fit for consumption in domestic grates.

Restriction of Calorific Value per Cubic Foot.

(5) From information supplied to the Committee, it would appear that, with regard to the quality of the gas generally supplied to consumers in days immediately preceding the war, the following figures may be quoted for the average gross calorific values, per cubic foot, at 60° Fahr. and 30 in. barometer, of the gas supplied during the year 1913 in six of the largest cities of Great Britain:

620, 596, 593, 582, 580, and 540 B.Th.U.

While it may be freely admitted that calorific value, though always an important one, is by no means the only factor to be considered in selecting a gaseous fuel for any particular purpose, the Committee are of the opinion that the proposal of the Fuel Research Board that in future gas undertakings may be allowed to supply, at their sole discretion, gas of any calorific value between 400 and 500 B.Th.U., ought to be very carefully scrutinized in all its bearings, especially as it involves a considerable dilution of the old "coal gas" by "water gas," with consequent much higher carbonic oxide and lower methane contents. Indeed, the Fuel Research Board hold that the "natural diluent for coal gas is water gas, made either from coke in a separate producer, or in retorts by steaming the hot coke."

Restriction on Carbon Monoxide.

(6) The composition of the gas obtainable by carbonizing British gas coals at high temperatures either in modern vertical retorts or coke-ovens, without steaming the charge, usually varies between the following limits, approximately:

	CO_2	CO	C_nH_m	CH_4	H_2	N_2
	2 to 3	5 to 10	2 to 4	25 to 35	45 to 55	5 to 10 p.ct.
Approx. mean	2·5	7·5	3·0	30·0	50·0	7·0

The calorific value of a gas of the mean composition indicated would be about 560 B.Th.U. gross and 495 net per cubic foot at 60° Fahr. and 30 in. barometer. The corresponding values for a "debenzolized" coke-oven gas, containing only 25 p.ct. of methane, would be about 485 B.Th.U. gross and 425 net; and inasmuch as the thermal efficiency of such carbonization processes is admittedly high,* there would appear to be no particular reason, on the ground merely of thermal efficiency, for seeking to supersede the 1913 practice. The plea for the change is presumably based on the desire, on the part of gas undertakings, to convert a substantial part (or possibly the whole) of the coke into water gas, and thus to increase the gas make per ton of coal at a corresponding sacrifice of the coke yield.

(7) Water gas may be generated from coke with a thermal efficiency of (up to) 70 p.ct. It contains on an average:

CO_2	CO	H_2	CH_4	N_2	
4·5	43·0	48·0	0·5	4·0	p.ct.

Its calorific values per cubic foot at 60° Fahr. and 30 in. barometer are approximately 300 B.Th.U. gross and 275 net, or rather more than half those of the "straight" coal gas already referred to. Its calorific intensity, however, is distinctly higher; but its range of inflammability with air considerably wider, than that of coal gas. Its high carbonic oxide content makes it a poisonous gas, and, owing to its high hydrogen and low methane contents, its mixtures with air are very liable to back-fire. For these reasons it is not a desirable gas for domestic uses unless largely diluted; and any large admixture of it with coal gas in public supplies would undoubtedly add materially to the dangers of carbonic oxide poisoning and of gas explosions in houses.

(8) With regard to the question of the dangers of carbonic oxide poisoning with a gas containing a large proportion of water gas, it may be recalled that twenty years ago this was the subject of an official inquiry by a Committee appointed by the Home Office, of which Dr. J. S. Haldane and the late Sir William Ramsay were members. They had laid before them detailed information as to the uses of water gas in the United States and its effect upon human health. In their report they stated:

> The most direct, and in our opinion the only effective, method of preventing danger from water gas is to fix a limit which the carbonic oxide in a public and domestic gas supply shall not, in ordinary circumstances, exceed. It is difficult to assign a limit applicable to all circumstances. In some cases 12 p.ct. of carbonic oxide in the gas supplied might be proper, in others 16, or perhaps 20. . . . We are of opinion that, with the present conditions of gas supply, 20 p.ct. is the highest proportion of carbonic oxide that should be allowed, and that this percentage should be used only under special circumstances. . . . Our attention has been called by several witnesses to the very imperfect and unsatisfactory gas-fittings often used in the poorer class of houses in large towns, and the constant leakages which exist without any attempt to discover or rectify them. . . .

Clearly, then, the 1899 Committee, having in mind the nature of carbonic oxide poisoning and the faulty character of gas-pipes and fittings in the poorer class of houses, considered that the carbonic oxide content of a public gas supply should in no circumstances be allowed to exceed 20 p.ct., and only exceptionally 16 p.ct. This Committee consider that even to-day a maximum limit of 20 p.ct. of carbonic oxide ought not to be exceeded. It may be pointed out that the Fuel Research Board's recommendations would allow of a gas company distributing a 40 p.ct. coal gas, *plus* 60 p.ct. water-gas mixture containing between 27·5 and 30 p.ct. of carbonic oxide.

(9) The Committee are unable to agree with the Fuel Research Board's apparent endorsement of the proposition that the relative values of different grades of gases are strictly proportional to their calorific values. On the contrary, they are of the opinion that the chemical composition of the gas is not a matter of indifference to the consumer, and that the cumulative results of forty years of scientific research on the subject prove that the fundamental properties of the explosive mixtures formed by different combustible gases with air, arising from their own peculiar chemical characters and modes of combustion, do affect profoundly their uses for both power and heating purposes.

* It has recently been shown that the two Metropolitan Gas Companies in the year 1913 actually sent out in the form of gas, coke, and tar, rather more than 70 p.ct. of the potential energy of the coal carbonized, and that over-all efficiencies exceeding 82 p.ct. have been attained in large-scale carbonizing tests.

MINIMUM METHANE CONTENT.

(10) It appears to the Committee that, in particular, the Board's report does not recognize sufficiently the importance of methane as a constituent of a public gas supply. Owing to the relatively narrow range of explosibility of its mixtures with air, and the low speeds at which flame is propagated through them, methane (in addition to the advantages of its high concentration of potential heat units) as a constituent has an important "steadying" influence upon coal gas, rendering it eminently usable for domestic purposes. Hitherto the public has been accustomed to using a gas containing 30 p.ct. or more of methane; and it is important that such proportions shall not be unduly diminished. Accordingly, the Committee would urge the adoption of 20 p.ct. as a minimum methane content in a public gas supply intended for domestic consumption.

SUMMARY OF PROPOSALS.

(11) If the Committee's proposals in the preceding paragraphs be adopted as safe and reasonable in the interests of domestic consumers, the gas might be sold (as proposed by the Board) on a thermal basis, subject to the following provisos:

(*a*) that its methane content shall not be less than 20 p.ct.; its carbonic oxide content not more than 20 p.ct.; and its content of "inerts" not more than 12 p.ct.

(*b*) that its gross calorific value per cubic foot at 60° Fahr. and 30 in. barometer shall not fall below 450 B.Th.U.

Within such limits, a gas undertaking would be at liberty to supply for domestic use either (*a*) "straight" coal gas, (*b*) "debenzolized" coke-oven gas, or (*c*) a mixture of 100 parts of coal gas with (up to) 50 parts of blue water gas. Where, however, gas is supplied in bulk for industrial uses only, a relaxation in the above conditions might be permitted, subject to agreement as regards cost between the gas undertakings and the consumers.

COMPLETE REMOVAL OF SULPHUR COMPOUNDS.

(12) In conclusion, the Committee hope that scientific men generally will strongly support the important recommendation made in paragraph 53 of the Board's report in regard to sulphur purification. The Board rightly urge "the more complete removal not only of the sulphur compounds but also of the cyanogen compounds." The important investigations carried out, from 1906 onwards, at the South Metropolitan Gas-Works by Dr. Charles Carpenter, in conjunction with Messrs. E. V. Evans and Doig Gibb, resulting as they did in a process whereby the sulphur content of the gas sent out from these works has been reduced from 40 grains to about 8 grains per 100 c.ft., constitute so notable an advance in the technology of gas purification that the time has surely come for legislative action in the direction of making such sulphur removal generally compulsory for all large gas undertakings.

ONE DISSENTIENT.

Mr. D. H. Helps, representing the Institution of Gas Engineers on the Committee, dissented from certain of the foregoing conclusions, on the grounds that if in future the consumer is charged for gas according to the number of heat units supplied to him in it, it will not be necessary to impose upon gas undertakings the restrictions in regard to inert constituents which the Committee has recommended. He was also opposed to the suggested limitation in regard to the carbonic oxide content, as well as to any re-imposition of the obligation upon gas undertakings to remove sulphur impurities other than sulphuretted hydrogen from the gas. In regard to the question of pressure, he was of opinion that a minimum of 1½ in. water-gauge would be found sufficient.

STRIPPING COAL GAS.

During the discussions which took place upon the question of gas standards, the attention of the Committee was called to what is known as the "stripping of coal gas," by which is meant the extraction of benzenoid hydrocarbons from it. This process has been instituted as a war measure, in view of the necessity for providing sufficient raw material for the manufacture of high explosives.

It was pointed out to the Committee, however, that, with gas selling at its present average price, it would probably be of greater financial advantage to the gas undertaking to allow the benzenoid hydrocarbons to remain in the gas if the sale of gas on the proposed new thermal basis is instituted. Though fully realizing the present national shortage of motor spirit, the Committee felt that gas undertakings should be under no obligation to remove benzenoid hydrocarbons unless the selling price of motor spirit would justify their doing so on financial grounds.

[The Committee recommends that it be reappointed to continue its investigations with a grant of £25.]

DISCUSSION.

Mr. R. MOND, commenting on the report, said copies of the Council's first report were laid before the Research Board. They wished to see if the Board would adopt any of their recommendations; but they had not carried out any systematic research of what coals there were in the country and what intelligent use might be made of them on economical lines, in the same way as America had done. The Committee were of opinion that the coal in the different fields and collieries should be properly examined and classified, so that they could know exactly the best uses to be made of the different kinds and qualities. In one large chemical firm with which he was connected, all the coals they had anything to do with were properly tested and classified. The Government were supplied with the information during the war, with the result that it was found valuable. Still, this was not the right way. The Coal Controllers were not the people to deal with it. Their business had been in trying to make coal go round when there was none to go round. In the first report of the Committee, they were anxious that a proper survey should be made of all coal in the country, and approach was made to the Fuel Economy Committee of the Government that a certain sum should be set aside for it; it was beyond the means of their own Committee. The work was more important to-day than it was five years ago; and the Committee were anxious, in spite of the recalcitrant position taken up by the Research Board generally, that this should be driven home to them—that a real survey of the collieries of the country was a thing which could easily be done by the nation, or it might be done by the coal industry. It was not a thing to be done by a committee of chemists. After reviewing the data contained in the report, Mr. Mond said the Committee had not devoted much time to the question of artificial fuel. This subject was reserved for the next report.

Sir ROBERT HADFIELD, F.R.S., said in his own Company's works they thought they knew a great deal about fuel combustion, and were economizing; but when they called in a real scientific man on the subject, the result was in a couple of years they were able to save ten times the amount. He did not think there could be a more striking example of applied science to industry. He had brought the matter to the notice of the Iron and Steel Institute, who intended to devote a whole day to a discussion on fuel economy. He had also brought it before the Federation of British Industries. The Federation represented something like 2000 business firms; and it seemed to him that if it would bring before its members the question of fuel efficiency it would prove of great service. He was glad to say a Committee had been formed. They had met a number of times, and a valuable report was to be presented, from which he hoped there would result further economies in the future. It was of the highest importance to study the question of fuel efficiency, for there were serious times ahead for the industries of England. There was no doubt that the country had been very wasteful in the past; but it did not apply to this country only. In America the waste was prodigious; and there was no doubt that in that country steps would have to be taken as in this. In America they were stirring up on the question, and a very valuable report was being prepared by the Mineral Resources Bureau in Washington. Touching on the heads of the Federation report, he said they represented the points that the Committee had been trying to make. The object was to increase manufacturing efficiency and conserve fuel, to help development and maintain efficiency and power, and the reduction of fuel and power costs. Another point he made was that of personal inspection. He said it might seem a small thing, but a walk round the works would often expose little points, and suggestions might come from those handling the furnaces that could be applied to economy. People often ran down the British workman. It was a great shame. He had found, by walking round among them and by stimulating their interest, they were only too willing to help in matters of economy. They too often thought the workman was stupid in these matters. But did they try to find the workman out? He did not think they always did. His experience had been that, given proper interest, the workman was ready to help his employers. Speaking on the subject of exchange between firms of information and statistics, Sir Robert said most of them had special lines of their own upon which they might not like to exchange views. But on the question of fuel, he thought they would be willing to exchange their researches. There should be no privacy, and he saw no reason why they should not pool their knowledge generally. One did not want to criticize the Research Board; but he thought it was time they shed a little light upon what they were doing. They were spending a good deal of money; and he was sure their information would be of advantage to the country. Sir Robert dealt with matters of procedure in investigation, organization, and the training of skilled workmen, and concluded by saying he thought it would be seen that in this country they were waking up, and were doing their best to meet this very important matter of fuel efficiency.

Mr. C. E. STROMEYER, of the Engineering Section of the Association, said he thought the Committee ought to know how they stood with regard to power. There had been some very wild statements floating about. He believed a cabinet minister had stated that the average coal consumption per indicated horse power was 7 lbs. Careful analysis had been made; and he said the consumption was 2 or 2½ lbs. per indicated horse power, and if heating was taken into account, 3 lbs. He did not think the three should be compared with seven—it was more like two. He thought the nation had been misled into hoping for far more from enormous power schemes than it was likely to get. In many textile factories throughout the country they had a large number of small steam-engines driving their machinery. They were high-pressure exhaust engines; and no doubt they used 7 or 8 lbs. per indicated horse power. But if the exhaust steam was used for heating purposes, the result was that all the manufacturer paid for power was about one-third of the coal. So nominally the consumption would be seven, but in reality it was only a third of this for power. In this way the public were led to believe they were using some twenty times more fuel per horse power than they really were. Speaking of power stations, he said if all the facts were known it might put a break on the attempt to spend enormous sums on them. He agreed that electric power was a great advantage, especially in works where little heating was required. On the North-East coast he thought the electric power scheme had worked fairly well, though not so cheaply as the power production in Lancashire. In the circumstances he thought they had effected a great saving, because in shipyards and works of that sort there were large numbers of machines standing idle most part of the day. Power must always be ready when the machines were required; and steam in these cases was a wasteful power—electricity being a great advantage. But in the case of a factory running at set speed, there could not be a better arrangement than to produce power and use it direct.

Mr. ARNOLD LUPTON said he was glad the Committee had suggested the limitation of carbonic oxide in gas. To him the introduction of

this "horrid" poison into our houses was horrible; and if it could possibly be reduced, he should support the proposal.

Mr. T. GOULDEN (the Gas Light and Coke Company) agreed that a survey of the coalfields of the country was most important, because it would assist in getting the coal particularly needed for special purposes. As had been mentioned previously, they had suffered in not being able to obtain coal that was suitable for them. Turning to the subject of gas, the gas industry were entirely in sympathy with the general point of view taken by the Committee. That was to say, the national policy of producing it at the lowest cost, consistent with reasonable safety. The interests of the consumers were also the interests of the companies. They did not pretend to be philanthropists; but it was the companies' business to satisfy the consumer, for unless they had the consumer's goodwill, and could satisfy him, out he went. Dividends to a large extent were regulated by the price to the consumer; and on a sliding scale the lower the price the better the dividend. They wanted to give the consumer a gas most suitable to his needs, at the lowest price; and the Fuel Research Board, in various parts of their report, agreed with this view. But they would rather resent any restriction on the constitution of gas. It would be impossible to supply gas economically if there were any stipulated composition to adhere to. They could not produce a gas of anything like 400 or 450 B.Th.U. by simply carbonizing coal; and the use of coke in grates must cause a good deal of labour in the household which should not exist. Gas makers were great economists of fuel. They conducted processes of manufacture which resulted in efficiency of not less than 70 p.ct., and which might reach well over 85 p.ct. This was a high figure; and in view of this he claimed that gas undertakings were great economists of coal. They could only make the best uses of it from the thermal point of efficiency. They produced what was absolutely necessary to the nation—they produced sulphate of ammonia and a large number of bye-products of the tar which were absolutely essential to the industries of the country generally. To restrict inerts would be to restrict economy. If inerts were restricted to 12 p.ct., coal could not be carbonized to the same thermal efficiency as now, and a position would arise that, instead of doing a service to the consumer, a distinct disservice would be done to him. Going beyond the consumer's point of view to that of the country's as a whole, instead of the 20 million tons of coal now consumed by the industry per annum, a considerably increased quantity would have to be used. They would certainly have to use another 10 p.ct., or (say) 2 million tons, without any additional benefit to the consumer. Referring to Mr. Arnold Lupton's remarks on the poison of carbonic oxide, Mr. Goulden said the companies distributed gas for people to burn, not to swallow. Long before there was any danger of explosion or injury to anybody, the human nose would detect the escape. Another point had reference to water gas and sulphur, which the Committee desired to restrict. Water gas contained only a small quantity of sulphur, with the result that when it got into the atmosphere the danger from it was very much minimized. Criticizing the reference to Dr. Haldane's report, he reminded the meeting that this report was twenty years old. Much had happened since then. Water gas was the only diluent for coal gas. It contained a small amount of inerts, it contained some of the constituents of ordinary gas, it was suitable to reduce high power to lower power, and was therefore a desirable thing to use. It sounded a great deal to say there were 40 grains of sulphur per 100 c.ft.; but this was not the general rule. The general run was 20 grains, or 30 grains at the most. Would it, he asked, be an advantage to the consumer to increase the price by (say) one halfpenny in order to restrict this infinitesimal amount of sulphur? It would be retrograde, in his view. Speaking of the lower chemical grade, Mr. Goulden said there was a strong idea that, with a large quantity of inerts, the British thermal unit did not do the same work. They had a very good measure of this point by the consumption secured through slot meters. The slot-meter consumer was the small consumer; and conditions were similar all over the kingdom. Quoting his own Company's experience, he said that in 1913 the slot consumers in his district used 8,165,000 B.Th.U. In 1918, there was a scarcity and difficulty in getting fuel, so that a larger consumption of gas was expected; but it was of the lower value made under war conditions. In spite of all difficulties, the slot consumer all over the district used 5 p.ct. less heating power in 1918 than he did in 1913. This was a striking proof of the fact that the lower power of gas made in no way injured the consumer. He burned 5 p.ct. less units in 1918 in spite of the dear coal, difficulty in getting it, and the difficult conditions.

Sir CHAS. PARSONS (the President of the Association) said Sir George Beilby's view was that the economization of coal had not been successfully attacked on a scientific basis. He thought it was far too soon to judge the Fuel Research Board. They were working hard, and perhaps in a year's time they would achieve good results. The Board welcomed criticism and suggestions.

Prof. W. H. WATKINSON said the country should have some further information on why the output of coal had decreased so much in this country and not so much in America. He could not believe it was because of the greater decreased effort of our workmen and the less decreased effort of United States men. There must be some other factor upon which they had not been enlightened. Upon the question of systematic investigation of the chemical character of British coal, he favoured harnessing all laboratories. Wherever a man was willing to work, he should be encouraged, and a grant given to enable him to carry on. His belief was that greater economies might be effected by super gas stations than by super-electric generating stations. The amount of energy required throughout the country could be distributed as cheaply by means of gas as electrically.

Lieut.-Col. H. W. WOODALL (Bournemouth) criticized the suggested restrictions. He said that what this country had suffered from was over-control. Mr. Mond had pointed out what had been suffered by people having sent to them coal that was not suitable to their needs and it being forced on them by the Coal Controller. He could give instances where valuable gas coal was sent to water companies, and of Welsh coal being sent to gas companies—coal which they could neither carbonize nor coke. All that was asked by the gas companies was greater freedom to carry on their industry, not only in their own interests, but in the interests of the consumer. At the present time it was obvious, from the proposals put forward, that even they did not know what were the best considerations. Was it fair that a great industry such as theirs should be handicapped by these restrictions? They might be desirable from a chemical point of view; but they had to look at the matter commercially. It was desired to get the product best suited to the district; and if these restrictions were placed upon them, it was obvious they would suffer in the future as in the past, and would not be able to develop on the most economical lines. In the gas industry they did not want to be trussed-up; and in considering the report, he begged of them to bear this in mind. In his district there were 23,460 houses. Of this number, 23,456 actually had gas in them; and every hampering restriction placed on the industry influenced every person in the district. Before these restrictions were imposed, he asked that the industry might have a few years to work out their own salvation in the supply of a most necessary article.

Prof. H. E. ARMSTRONG said the subject was such an important one that he regretted the President of the Association had not brought it into greater prominence in his address. He challenged the President, as the head of the Advisory Council for Research and the Fuel Research Board, to make the investigation an open one. They all had the greatest respect for Sir George Beilby; but there was a very strong opinion among chemists that Sir George was keeping the research to himself. It must be made an open one. Referring to a letter from Lord Askwith in "The Times" on "Nationalization of Coal: More Knowledge Needed," Prof. Armstrong said it was not so much that more knowledge was needed as that it should be brought together. Sir George Beilby should bring them together time after time to discuss every issue and deal with it properly; and he challenged him to do this. He should also offer the challenge elsewhere. In these days, they must have some courage. The Board had taken on research, and then warned off everybody else. It was absolutely unsound. Ideas were not centred in one individual or one centre. Imagination was needed; and it was never known where it could be found. Coal was a thing of which enormous quantities were required. Gas needed 150 million tons. The industry would go smash very soon if they did not look out. His own opinion was that the gas industry could not exist many years on its present methods. It must be wiped-out if it did not reform its methods. The argument of one speaker, that there had been a reduction of 5 p.ct. in the gas used in the district, spoke against the speaker. The first consideration was economy; and all that he could show was 5 p.ct. Lord Fisher had said that the Navy was to be worked with oil. Where was it to come from? America said that 25 years hence she would have none at all. "You are not going to find any in this country." A good deal could be obtained from coal if they were careful. If they were to carry out Lord Fisher's programme, they would need to get all the oil they could from coal; but it could not be got by the present methods of the gas industry. The gas industry could not survive as an industry producing its own gas; and they knew it. This was why they wanted a reduced standard. Until the gas industry was combined with a power producing industry they could not solve the problem of using gas for heating purposes. Nobody would use gas for lighting purposes in the future if they could help it. The gas industry must be combined with an industry that was producing gas as a bye-product. Only within the last few months he saw an experiment carried out with a ton of a particular coal which gave a most magnificent heating fuel, and with it 18 gallons of tar, 15 lbs. of sulphate of ammonia, 72 p.ct. of smokeless fuel, and 8000 or 9000 c.ft. of gas. A coal of this kind was most valuable, and all that the gas companies would require. There was a great deal of knowledge to be gained in the country—there was a great deal of experience, and many people were thinking over the matter. The problems were not small; and the research should be thrown open. What was needed was to bring competent people together to deal with it. At the present time it was being done in that very human way of keeping things to themselves. Sir George Beilby was a very reticent type of man; and they had got to force him to be less shy.

Electro-Plating and Gas.

Mr. Gilbert C. Shadwell, continuing in the "American Gas Engineering Journal" his series of articles on industrial openings for the use of gas, says there are still many plants in connection with the electro-galvanizing and allied industries which do not use gas. Inasmuch as the durability of the electro-deposited coat on plated wares of all kinds is of the utmost importance, the greatest care must be taken to ensure its complete adhesion; and this can only be effected if the surface of the metal on which the deposit is to be made is chemically clean. All grease must be removed by potash, whiting, or other means, and tarnish by an acid or potassium cyanide; washing in plenty of water being resorted to after each operation. This is where the gas man can offer his services. Hitherto steam has been considered a cheap commodity; but with rising costs of coal and labour, the cleaning tanks which were previously heated by such means can now often be more economically heated by gas. Moreover, steam-heated tanks are seldom insulated, so that the heat losses are quite appreciable. In fact, an uninsulated steam-heated tank will probably show at the very best an efficiency of only about 30 p.ct. of that of a properly constructed gas-heated tank. There is therefore, says Mr. Shadwell, plenty of encouragement for the gas man who will use a little thought in going after this class of business. For drying after cleaning, a gas heated cylinder may be used, through which the articles are automatically carried by means of a spiral. For larger dryers, a gas-fired air-heater is employed, and the outlet connected to the end at which the goods leave the cylinder, so that the heated air travels in the contrary direction to the goods. Mr. Shadwell describes a machine which actually washes, drains, and dries all small articles; and attention is also drawn to other openings for the use of gas in connection with these largely-used processes.

CANADIAN GAS ASSOCIATION.

Twelfth Annual Convention.

In the latter part of last month, the twelfth annual convention of the Canadian Gas Association was held at Niagara Falls—under the presidency of Mr. C. C. Folger, who was assisted in his labours by the Secretary-Treasurer of the Association (Mr. George W. Allen, of the Consumers' Gas Company of Toronto. The new President is Mr. V. S. M'Intyre, the Superintendent of the Kitchener (Ont.) Light and Power Commission.

The programme was an extensive one; and after the delivery of the Presidential Address, the reading and discussion of papers was proceeded with. The first paper was by Mr. E. M. Paterson, the Superintendent of the New Building Bureau of the Gas Consumers' Company of Toronto; and the subject was "Co-operation with Plumbers, Manufacturers, and Dealers." He said that the gas undertakings are in business to manufacture or produce gas and sell their product to the public. The piping of buildings and the sale and installation of appliances, are more or less a secondary object, or a means to an end. The plumbers are the first in the field, as they should pipe the buildings; and their interest in the gas business ought to be aroused. To bring about a desirable co-operative understanding with the plumbers he made the following suggestions: (1) The elimination from the mind of the plumbing fraternity of the idea that their help is not wanted, and that the companies prefer to do all the gas-piping. (2) The education of the plumbers as to correct and adequate gas-piping, in conjunction with safe, economical, and efficient appliances, and the absolute necessity of flue connection. (3) The encouragement of the plumbers to become merchants, and to take full advantage of their opportunities to sell gas appliances. (4) The regulation of prices and charges, with the idea of seeing that all concerned—the fitter, the plumber, and the gas company—receive adequate payment for work performed. (5) The offer of trade discounts to plumbers purchasing appliances, &c., from the gas companies. (6) In case of payment by the consumer for appliances by instalments, the possibility should be considered of doing something for the plumber introducing the business. With the manufacturers, too, Mr. Paterson thinks that co-operation is very desirable. The gas companies have unique opportunities for finding out both the strong and weak points of appliances. At the present time there are no official regulations governing either gas-piping or appliances; and in order that all apparatus shall be made on safe, sane, and efficient lines, it is necessary that some sort of co-operative plan should be formed. The standardizing of the essential points in a particular gas appliance would not necessarily rob this appliance of its individuality. Each manufacturer could still embellish it with certain features peculiar to his own taste and the particular class of trade that he was catering for. Lastly, he declared (quoting his own experience) that co-operation with the dealers, with the avowed object of increasing the consumption of gas by the sale of approved appliances, should meet with success.

Mr. John E. Philpott, of the Hotel and Restaurant Equipment Department of the Toronto Gas Consumers' Company, followed with a contribution on the "Domestic Science School as a Sales Producer." He declared that the advantage of the domestic science school from an advertising point of view is far greater than even the average gas man realizes, as the children talk over in their homes the daily school happenings. The parents are told of their cooking successes, and immediately become interested. The installation in such institutions of gas cookers and water-heaters is therefore of the first importance. The author gave an account of the success attained by his Company in securing business of this kind, and in getting gas appliances fitted in the large mercantile and factory kitchens, cafés, hospitals, and other institutions, as well as hotels and restaurants. It is, he said, clearly up to the salesman to go out and get this business; and if he has the proper co-operation of his employers, and if he hustles and keeps everlastingly after it, fulfils every promise (never promising too much), showing his prospective customers that he wants to help them in getting greater efficiency, quicker service, a cleaner and cooler kitchen, no dirt, dust, or ashes, no firemen to pay and feed, a quick fire always at hand, and many other advantages that gas has over every other fuel, he is bound to succeed. He should always keep in mind that his work is not finished with the signing of the order or the installation of appliances. This is, of course, really only the beginning; for after that he must instruct the cooks how to operate the appliances efficiently and economically, and how to take daily readings of the meter. It is also a good plan to inform the proprietor or manager of the importance of the last-named point, as enabling him to ascertain his daily fuel costs.

The particular system of heating houses with gas of which he is the inventor was described by Mr. H. Stansfield-Dodd, who explained that several years ago the internal combustion engine attracted his attention; and he thought that if he could maintain continuously such combustion in a sealed chamber, a very high and efficient flame-temperature could be obtained; but the flue temperature would necessarily be high. So when designing his boiler, he provided a combustion chamber at the top. Small tubes of suitable metal are expanded into the top, and are connected to the bottom of the secondary chamber in the same manner. These tubes are surrounded by larger tubes, which are expanded into tube plates, thus making a tube within a tube. The co-efficient of expansion of these tubes being equal, no strain is produced. The secondary chamber is provided with a flue at the bottom, with a packing which allows the heater-element to be free. This heater-element is surrounded by water, except where the burner opening at the top is situated, and the flue at the bottom. By this means, the water picks up all the B.Th.U. that are transmitted to the heating surface. One of the principal features in the operation of the appliance is a fan, which is preferably connected direct to a very small electric motor. This motor is controlled by the thermostat which operates a magnetic switch that puts the motor at high or low speed, as required. The fan produces a suction on the combustion chamber, and all the pipes connected thereto; while at the same time it sucks up the diaphragm of an automatic valve, and in so doing raises a weight which allows the fluid of the seal to take the place that it occupied—thus uncovering the gas-outlets, and permitting the gas to enter the mixing-chamber. An explosive mixture is then drawn up to the burner, and in its passage is preheated by the burnt gases and the hot water. The flame and burnt products are then drawn down between the small and large tubes to the secondary chamber, and finally the products go to the fan, where they are discharged into the flue. The point of discharge of the water receives the greatest heat; the conditions being just the reverse to the ordinary furnace, with the fire at the bottom.

"Cheaper Gas" was the title of a paper by Mr. R. O. Wynne-Roberts, of Toronto. He remarked that the cost of coal and oil is increasing, and wages are on the up-grade; and as a consequence the price of gas must be raised. But it is, at the same time, of national importance that efforts should be encouraged by the Government to supply cheaper gas; and this may be accomplished by reducing the standard calorific value. The Government advocate conservation; and they might lead public opinion in the way of the utilization of cheaper materials for the manufacture of gas. Furthermore, it may be contended that, if a lower calorific standard were permitted, it would be possible, in some parts of Canada to use peat, lignite, and bituminous coals which are not now carbonized. The manufacture of lignite gas, made under favourable conditions, promises to satisfy reasonable requirements at a much lower cost, provided the standard calorific value is suitable. Unfortunately, Canada possesses few (if any) beds of gas coal; and consequently the undertakings there are dependent upon the United States for a supply. It has been proposed by the British Fuel Research Board that the consumer should be charged for the actual thermal units supplied to him in the gas which passes through his meter. It may further be suggested that the gas undertakings should be allowed to pay increasing dividends as the price per million heat units is reduced. There is no more reason that the thermal quality of gas should be stereotyped throughout the land, than that the hardness or softness of water should be specified, or that building materials should be standardized. The strict uniformity of the thermal value of gas is perhaps a relic of other days, when the public was as a general rule less informed, and the gas industry was in its infancy.

In a paper on the "Piece-Work System as Applied to Meter Readers, Billers, Delivery Men, and Collectors," Mr. J. A. A. Beaudin, the Manager of the Collection Service Department of the Montreal Light, Heat, and Power Company, described the working of this plan in connection with his own undertaking. What he had to say was summed-up in the remark that the piece-work system, as applied to certain specific routine operations, is a happy innovation. It is most effective and economical, and it ensures a steady output. It may, in fact, be regarded as a modern stabilizer.

Another paper was by Mr. Arthur V. White, on "Future Fuel Problems of Canada." The author, who is Consulting Engineer to the Commission of Conservation of Canada, pointed out how largely that country is now dependent upon the coalfields of the United States, and emphasized the necessity for Canada to develop her own vast fuel resources, and by co-ordination of transportation and other cognate agencies to provide for the distribution of fuel to all communities in the Dominion. The important bearing of the gas industry on the fuel problem was acknowledged; and Mr. White urged the establishment of a central research laboratory where the more technical problems relating to the industry could be solved for the benefit of all.

During the sessions, there were also a number of open discussions on other subjects.

Carbon Electrodes from Natural Gas.—In view of the finds of oil and natural gas in the United Kingdom, says "Engineering," it may be of interest to point out that natural gas, especially when not sufficiently plentiful for lighting and power purposes, may be cracked to produce electrode carbons. The gas is passed through pipes which are so heated as to produce a mixture of soot and tar. The mixture is briquetted and then baked. The electrodes obtained are free from ashes; and the proportion of tar in them can be varied by adjusting the temperature to which they are heated. According to the "Journal für Gasbeleuchtung" of March 17 last, Dr. E. Szavasy, of Budapest, was making carbon electrodes in this way for the metallurgical works of Transylvania from the natural gas which is found in some parts of Hungary; but the news was probably older than the renewed political troubles of those countries.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

The Meaning of the Beilby Report.

SIR,—I do not think we have misinterpreted the Beilby report—at any rate, I hope not.

I understand its object to be that of putting gas undertakings in the position of being allowed to supply gaseous energy in whatever form they can most cheaply deliver it to the consumer. One of the conditions of the liberty thus given will be the duty of so adjusting the consumer's appliances as to ensure his getting value and convenience for his money.

I find no suggestion whatever in the report that the quality of the gas supplied by any undertaking is limited to certain fixed points upon a scale ranging from producer gas as a zero to say natural gas as a maximum.

As a result of the war, not a few undertakings seem to have partially lost the art of gas making, and for them the four classes of gas-consuming *appliances* mentioned in the report would probably be adequate—viz., 400, 433, 466, and 500 B.Th.U.

But when, under the incentive of selling energy instead of *gases*, their forgotten knowledge comes back to them, they might find it would pay to distribute their energy in a more concentrated form; and it would be perfectly open to them to do so, always provided the consumer's appliances are corrected for the change.

This is how I read the report; and I do not think any other construction can be placed upon it.

CHARLES CARPENTER.

South Metropolitan Gas Company,
709, Old Kent Road, S.E., Sept. 13, 1919.

Mr. Cranfield's North British Association Lecture.

SIR,—I have read in your issue of the 9th inst. a report of Mr. W. Cranfield's address to the North British Association of Gas Managers, and should be obliged if you could find room for the enclosed, as an open letter, in your columns.

ALEX. C. IONIDES, JUN.

"*Captive Fire*," 34, *Porchester Terrace, W.*
Sept. 11, 1919.

[ENCLOSURE.]

W. CRANFIELD, Esq.,
c/o the "Gas Journal,"
11, Bolt Court, Fleet Street, E.C.

SIR,—It is with great interest and pleasure that I have read a report of your address to the North British Association of Gas Managers. My perusal thereof impels me to write and ask you the following questions.

1. [P. 567, par. 2, lines 16.]—Do you mean, by the expression "fully aerated," that a quantity of air, with secondary air from the atmosphere in which it burns, will roughly approximate a neutral mixture?
2. [P. 567, par. 2, lines 10 14.]—Is not the superiority of the inverted over the upright incandescent burner probably due in the first instance to draughtless combustion, whereas in the second case a draught, and ofttimes a varying one, is induced?

I am delighted to find that my experiences, in the main, endorse all your claims. But even this "advance guard" of gas engineering seems unaware of a few facts with respect to the complete combustion of gas; and because of the common interest we have in the subject, I am sending you the following notes:

(1) A perfectly neutral mixture has *no* outer cone or halo. I suggest that that outer cone or halo may be due to incandescent carbon escaping unburnt.
(2) It is, in ordinary circumstances, impossible to burn this mixture in the open, without the application of extra heat.
(3) It is only with draughtless combustion, when the flame burns in its own hot bye-products, and no further oxygen is accessible to it, that a neutral mixture can be burnt and maintained.
(4) A "neutral self-supporting mixture," if it did burn in the open, would cease to be "neutral." Hence the significance of "draughtless combustion."

Facts 1, 2, and 3 lead one to infer that a "pleno mixture" is a calculated theoretic one, and *not* the same thing as a "neutral self-supporting mixture," in fact. There is no such fact as a "coneless flame;" and if you try the experiment with two meters, one for the gas and one for the air, with balanced pressures, you will find, as you add air to a reducing mixture, that the flame first grows shorter, until it reaches a minimum length and loses its sheath, and then lengthens out again until the flame temperature is lowered to a point at which it no longer supports combustion.

If you have been correctly reported on p. 569, line 19, surely you are underestimating the intelligence of the consumer?

Price for price, the high calorific value will always be more acceptable to the consumer than the low, because it will make more of either a pleno mixture or a self-supporting neutral mixture.

Now, Sir, I have put some facts and considerations before you, with the conviction that they may interest you and others. It only remains for me to add that I shall be very happy to give you, or any others who may be interested in the subject, a demonstration which will support my statements if you will make an appointment to come to my laboratory.

ALEX. C. IONIDES, JUN.

Agitate! Agitate!! Agitate!!!

SIR,—As one of those responsible for calling the recent meeting of the Southern Division of the National Gas Council, I thoroughly concur with all you say in your leaderette "Do speak out." But I would explain that the meeting was convened with a view to considering ways and means of opposing the recent Order of the Coal Controller, and there was no thought at this stage of inviting the Press to be present.

However, very practical points were dealt with in the discussion; and a director of several gas companies who was present strongly advocated making the proceedings public through the Press generally. His views met with strong approval, in spite of one or two timorous souls who for some reason seem to fear publicity. We have such a good case that I do not think we can make it too well known; and it appears to me the proper thing to take the public thoroughly into our confidence, and let them understand the true explanation of the uncertain supply of gas and its high price.

I have consistently taken this course, as you are aware; and if it was generally followed, I feel pretty sure that public opinion would bring such pressure to bear on the Government that there would soon be some alteration. I know that the Member of Parliament for this division has received correspondence from our consumers on the subject. The gas industry has never secured proper treatment from the Coal Controller; and it apparently stands last on his list for consideration.

No reasonable being would have objected in a time of difficulty, like the Yorkshire coal strike, to a partial and temporary application of the seaborne Order; but to make it complete for the whole of the South, with the serious disabilities (financial and practical) which it entails, is beyond all reason and must be strenuously fought.

I fear we are suffering for our unbusinesslike attitude during the war—an attitude which did more credit to our hearts than our heads. When called upon to supply indispensable munitions of war, we rushed forward with offers of service without exacting any conditions (except that we should not be prosecuted by the local authorities for assisting our country), and extracted benzol at an actual loss, and to the annoyance of our consumers. This was very patriotic, but it was not business; and to tell anyone these facts now is to invite expressions of incredulity.

If the gas industry had been controlled by foreign Jews, it is highly probable that it would be in a much different position to-day. The first condition those very business-like gentlemen would have insisted upon would have been a guarantee of proper coal supply and the maintenance of full dividends. They would probably also have demanded much more, and got it.

I imagine no one in the industry will maintain that we have received fair and reasonable treatment. On the contrary I think the majority share the opinion that the attitude of Government Departments towards us has been most inconsiderate and unreasonable. The disabilities imposed upon us are doing the industry considerable harm; and if the Board of Trade really desired to strangle it, I doubt whether they could have discovered a much better method.

You truly describe the succession of Orders as damaging and senseless. Then let us give our grievances as wide publicity as possible, and AGITATE! AGITATE!! AGITATE!!! (publicly) until they are righted.

SIDNEY O. STEPHENSON.

Worthing, Sept. 12, 1919.

Supplies of Gas-Stoves in France.

In a page of "French Notes," a recent issue of the "Ironmonger" said: All countries that depend on imported coal will find themselves confronted with an acute and prolonged shortage of fuel; and their only hope of easing the situation lies in providing a substitute. The situation in France is critical. . . . In cities like Paris, where it is pretty certain that there will be no failure of gas supply, gas-stoves offer the best solution of the heating difficulty; but in the great majority of towns, and even in some of the Paris suburbs, gas is served out so parsimoniously that it is impossible to depend upon it for heating purposes. The demand for gas-stoves is therefore not so great as in normal times; and, if it were, manufacturers would be quite incapable of supplying what was needed, on account of the great difficulty of obtaining castings. The business in gas, anthracite, and other stoves in which iron castings are employed, was centred largely in Revin and other places in the Ardennes. The foundries have been damaged or destroyed; and it is not expected that they will be in working order again for at least a year, and meanwhile manufacturers are getting quite a large quantity of stoves from England—of course to their own designs and bearing their own names. Apart from the advantage offered by English firms of supplying good castings, it is probable that imported stoves cost less than those manufactured in France, where producing costs are extraordinarily high just now.

The Gas Industry and Co-Partnership.—In the gas industry, during 1918, according to a report issued by the Labour Co-Partnership Association, a smaller amount was distributed in profits than in any previous year since schemes of co-partnership were brought into operation. Since 1913, the bonus per worker on earnings has fallen steadily. In that year it was £5 13s. 6d. In five out of 37 companies which have adopted profit-sharing the scheme has been in abeyance throughout the war. In many cases it was found necessary to alter the scheme, so that workers might obtain benefits by doing better work. Some were awarded bonuses to tide-over war-time prices. With fourteen companies dividends have vanished.

Watford Gas Company.—The statutory dividends were declared at the half-yearly meeting of the Watford Gas Company, when the Chairman (Mr. E. J. Slinn) said the cost of coal and oil had increased 16 p.ct. over the corresponding half of 1918. Their coal cost them 100 p.ct. more now than in 1914. Wages, which worked out at 8d. per 1000 c.ft. of gas sold in 1914, came to 1s. 4d. in the past half year—again exactly 100 p.ct. increase. The receipts from gas were substantially greater; but this was largely due to an increase of 8d. per 1000 c.ft. in the price. However, they had made sufficient to pay their depleted dividend, and had a little to carry forward. The effect upon them of the seaborne coal order was nearly disastrous, as to bring the coal by sea cost them 11s. 6d. per ton more than if brought by rail. Gas companies did their best during the war; and "now they were treated like an old pair of boots, and kicked to one side."

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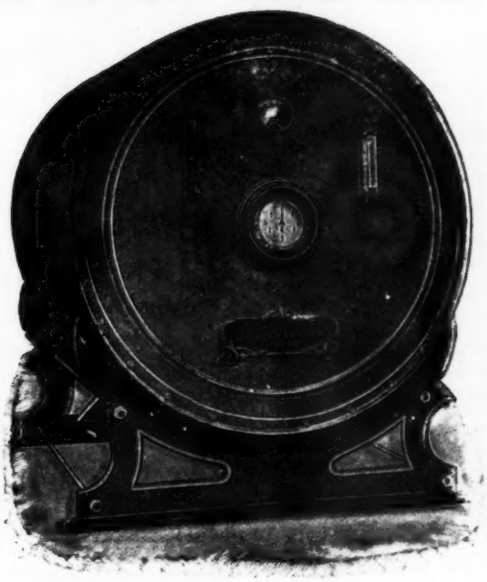

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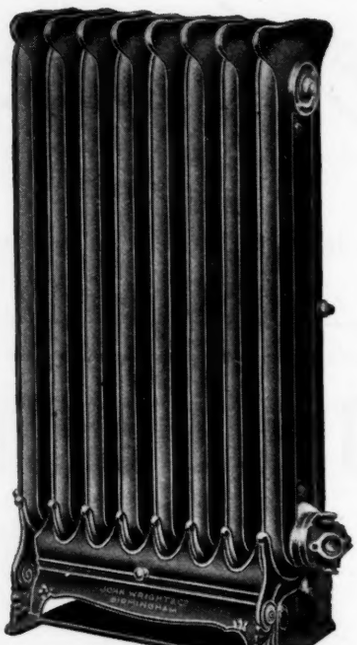

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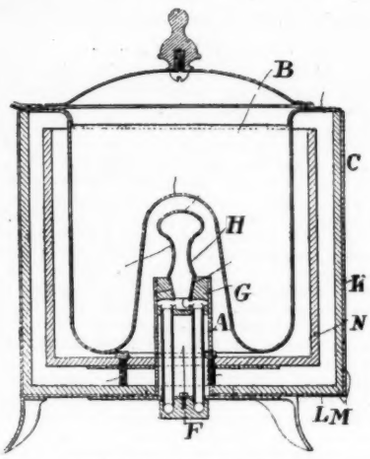
REGISTER OF PATENTS.

Gas-Burners.—No. 130,161.

IONIDES, A. C., JUN., of Porchester Terrace, W.

No. 12,202; July 26, 1918.

The object of this invention is "to provide simple and efficient means for burning a correctly proportioned mixture and transmitting the heat generated thereby to the matter which is to be heated."



Ionides' Gas-Heating Burner.

A vertical section through the burner, when applied to a liquid heating device, is given.

The burner A is arranged beneath the liquid containing element B within a double heat insulating shell C. The constituents for forming the gaseous mixture (say, coal gas and air) are lead to the base of the apparatus by separate conduits, which enter a double elbow piece F and pass upward as parallel and closely adjacent tubes to a mixing block G, above the inner floor of the double shell. A central, slightly tapered, cavity is provided in the block, into the bottom of which the gas and air conduits are led by passages tangential to the circumference of the cavity; so that the gaseous fluids, on entering, will adopt a whirling motion and become very intimately mixed together. The burner tube H is constructed from silica glass, and its lower end is tapered and ground externally to fit accurately the tapered cavity in the mixing block. The upper portion of the burner tube is opened-out or flared, and within this portion the combustion zone originates.

The double heat insulating shell C is formed of an open vessel K, lined throughout with heat retaining substance M, within which an inner concentric receptacle N is supported. The outer metal container K L of the double shell is preferably supported upon feet, raising it above any support upon which it is standing a sufficient distance to allow of flexible connections being made to the gas and air pipes D E.

To light the burner, the liquid container B is removed, and the gas being turned on in excess, the mixture is ignited, and the air and gas supplies adjusted until the mixture burns within the coned or flared end of the burner H; the products of combustion escaping through orifices. The liquid container is then replaced and, covering the burner and reaching down nearly to the bottom of the inner receptacle N, forms an enclosure down which the products of combustion flow. Upon reaching the bottom of the liquid container, the products of combustion flow outward to the walls of the inner receptacle, up which they flow in contact with the outer surface of the liquid container, until they reach the upper edge of the inner receptacle N, when they are deflected by the flange of the liquid container and pass downward again through the annular space between the inner receptacle and outer lining, and, after flowing inward beneath the bottom of the inner receptacle, they finally escape through apertures in the bottom of the container and plate.

Treating Fuels to Improve their Calorific Value.
No. 130,455.

BONE, W. A., of the Imperial College of Science and Technology, London.

No. 12,399; July 30, 1918.

The patentee claims to have found that profitable carbonization of brown coal and lignite preparatory to their utilization as fuel does not begin until the temperature exceeds 250° C., and ceases at about the temperature at which the oils begin to appear as products of destructive distillation. As the temperature is increased above 250° C., a further quantity of water is eliminated; and the proportion of carbon in the mass is increased, and that of oxygen decreased. The product is a fuel of enhanced calorific value as compared with the original material.

Since the temperature in question rarely exceeds 400° C., and in the case of some lignites is not above 375° C., the operation necessary for raising the grade of such fuels according to this invention is of comparatively low cost. The material may be treated in externally heated retorts or chambers "by any known continuous or intermittent procedure;" but inasmuch as the vapours and gases expelled or produced by the heating are of comparatively little value, it is economical to pass hot vapours or gases through the chamber containing the material, particularly as the temperature required is generally below that of flue gases or like waste gases from boiler furnaces, gas-retort settings, or the like. Such gases are applicable, provided they are chemically inert, or substantially so, towards the material at the temperature named, or that their content of reactive oxygen is low enough to avoid exothermic oxidation sufficiently vigorous to raise the temperature of the material above the desired limit. For this reason air alone is seldom applicable when the process is conducted as a single operation. Sometimes, however, it is profitable first to expose the material to heated air at a temperature below that at which exothermic oxidation becomes vigorous, and then to substitute heated gas or vapour sufficiently free from constituents which can react with the material at the higher temperature to which it is heated. In any case, the operation of heating the material by hot gases or vapours may be on the counter-current principle; and whatever the mode of heating, it may be conducted in more than one stage.

The invention is illustrated by reference to the effect of the process on the Morwell brown coal from Victoria, Australia. This material contains 48 p.ct. of water and 52 p.ct. of coal substance (including ash 4 p.ct.). Its calorific value is only 5855 B.Th.U. per pound. When heated at 105° C. it loses the water, and then has a calorific value of 10,060 B.Th.U. per pound. On continuing to heat the dried material so as to raise its temperature gradually above 105° C., the known loss of water and gases occurs; and above 250° C. there are further chemical changes in the coal substance whereby more water is expelled together with a small quantity of non-inflammable gas composed chiefly of carbon dioxide. Oil first appears as a product of the heating when the temperature is about 380° C. Hence the preferable mode of applying the process to this brown coal consists in heating the coal at a temperature about 375° C., until the elimination of water and gases at this temperature has substantially ceased. In this manner 100 parts by weight of the coal dried at 105° C. yield 88 parts of a coal, the calorific value of which is 11,460 B.Th.U. per pound.

From the foregoing data, it may be calculated that 100 parts by weight of the raw coal, 52 parts of the dried coal, and 45·75 parts of the treated coal have the same heating value. It follows that the potential energy of the raw coal can be concentrated by this process before transport.

The heating operation is conducted preferably by passing the hot products of combustion through a column or layer of the fuel, whether vertical, horizontal, or inclined. Boiler flue gases having a temperature of 400° C., and containing from 10 to 12·5 p.ct. of CO_2, when passed over the raw coal in question, contain sufficient heat to dry the fuel and to raise its temperature to 375° C., without any danger of exothermic oxidation sufficiently vigorous to raise the temperature of the material higher than this—that is, without danger of ignition of the coal. This is also true if the gases be passed over the coal which has been dried (at 105°) as a separate operation, but not, in any case, if the content of CO_2 in the gases falls much below 10 p.ct. Since, in a properly fired boiler (which may consume the coal in question after it has been treated by the process) it is easy to obtain flue gases containing 10 p.ct. of CO_2, and to let down the temperature of these gases (if necessary) by means of an economizer to 400° C., "the process becomes a valuable adjunct to a power station consuming the coal."

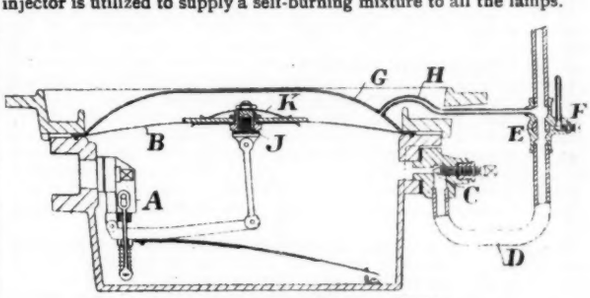
A particular apparatus for drying fuels by means of flue gases will be found described in patent No. 124,314, and is applicable for raising the temperature of the fuel as high as 400° C. if the passage of the fuel through the flue gases is sufficiently slow.

Governor Device for Gas Lighting Installations.
No. 130,786.

KEITH, J. & G., of Farringdon Avenue, E.C.

No. 13,107; Aug. 13, 1918.

This invention relates to a governor device for gas lighting installations, applicable primarily to railway carriages equipped with a number of incandescent gas-lamps fed on the group system, in which a single injector is utilized to supply a self-burning mixture to all the lamps.



Keith's Gas Lighting Governor Device.

As shown, the governor casing is fitted with an admission valve A controlled by lever arrangement operated by the diaphragm B. C is is an obturator, the setting of which determines the pressure at which the governor will work. D is the outlet pipe leading to the injector for the burners, and fitted with a stop-cock E for cutting-off the gas supply when desired. The stop-cock is arranged to control a bye-pass F leading to the pilot lights; the arrangement being such that when the cock is set to cut-off the supply, gas passes to the pilot lights; and when the cock is set to permit the passage of gas to the burners, the gas to the pilot lights is cut off. A cover G is fitted, gas-tight, to the casing above the diaphragm; and from the space above the diaphragm a connection H is taken to a point of the pipe D beyond the cock E that is more remote from the obturator than the cock. J is a blow-off or relief valve fitted to the diaphragm and normally held closed by the

action of the spring K; the function of the valve being to prevent the establishment of a heavy unbalanced pressure on the diaphragm when the cock is set to close the passage through the pipe D.

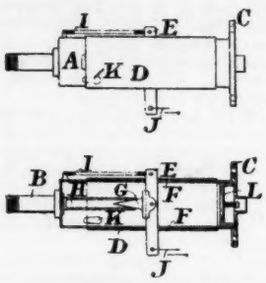
Coal-Gas Carburettor for Gas-Driven Motor Vehicles.—No. 130,793.

BUCKINGHAM, E. J., of Herne Hill, S.E.

No. 13,337; Aug. 16, 1918.

This invention more particularly relates to the type of carburettor in which a sleeve-valve controlling the admission of gas to the engine has connected with it a further needle or cone valve device which automatically allows the correct proportion of air to mingle with the gas at all times.

An elevation of one form of the apparatus, and a sectional elevation are shown.



Coal-Gas Carburettor for Motors.

A is the mixing chamber of the carburettor (cylindrical in shape) having attached to one end the connection B for attachment to the source of gas supply; the other end being fitted with a flange C for the induction pipe leading to the cylinder or combustion chamber of the engine. Mounted on A is a cylindrical sleeve D, which fits the surface of the chamber closely and is adapted to slide axially on it. A rod or bar E attached to the sleeve is free to move in the direction of the axis of the carburettor in the slots F. Attached to the bar is a conical valve G, projecting into, and seating in, the end of the pipe H, which projects into the interior of the chamber. The valve is normally held closed by the spring I, but is adapted to be opened by the connection J, which is moved by the control-lever operated by the driver of the vehicle.

A slot or aperture K (uncovered more or less as the sleeve is moved) is so proportioned that, as the valve is withdrawn and admits gas, so the aperture is uncovered and allows a greater quantity of air to enter in the correct proportion. L is a non-return valve fitted in the end of the mixing chamber and adapted to be opened by the suction of the engine, to allow the gas and air mixture to be drawn into the engine cylinders.

The carburettor may be either connected to the induction pipe of the engine or connected to the petrol carburettor; so that either petrol or coal gas may be used as desired.

Dehydration of Tar.—No. 131,087.

C. A. KLEIN, of Brimsdown, Middlesex.

No. 7032; April 26, 1918.

This invention, while particularly applicable to the treatment of tar from gas-producer plants, can be used with advantage in the case of any other form of coal or tar oil.

Various processes have, the patentee points out, already been proposed for this purpose: (*a*) The heating of thin films of the wet tar to drive off the moisture; (*b*) the employment of centrifugal machines with heat; (*c*) partial distillation of the watery tar, resulting in the removal of the light oils as well as the water; (*d*) separation of the water from the tar by long standing with or without slow stirring and heating. The difficulty which has arisen in these and like processes appears (he says) to be that globules of water are enclosed in the tar and are so protected thereby that the water cannot be removed.

He claims to have found that if reverse conditions are established, so that excess of water is present, and the tar is divided into small drops so that it can be brought into intimate contact with the added water, the water that was in the tar is readily given up, and a product is obtained containing not more than 4 p.ct. of water; whereas the original mixture of tar and water may have contained as much as 45 p.ct. of the latter.

The process proposed can be carried out in various ways, provided more or less violent agitation of the water and tar is obtained and a large excess of water is employed. For instance, the watery tar may be heated by direct or indirect steam to a temperature of over 40° C., and then forced through a perforated plate or screw into a vessel containing water at a temperature of over 40° C., in which the tar can settle. The passing of the watery tar through the plate (conveniently formed of corrugated sheet iron through which the holes are punched so as to leave the extruded metal projecting downwards) has the effect of breaking-up the tar into small globules, so that a large surface is exposed to the water into which it falls.

The breaking-up of the watery tar may alternatively be effected by causing a jet of steam or water to impinge on a jet of the watery tar at a point above the vessel containing the water into which the divided mass falls. Another method of carrying out the process consists in heating watery tar in an excess of water by means of live steam—the jets being arranged at or near the bottom of the vessel, so as to thoroughly break-up the tar into small globules in the hot water. Or, further, the desired result may be obtained by violent mechanical agitation of the watery tar in the presence of an excess of water at a temperature of over 40° C.

In any of these methods the treated tar is finally allowed to settle at either the bottom or the top of the vessel (depending on its specific gravity), and is drawn off through openings arranged at suitable points. Or the process may be made continuous; the dehydrated tar being drawn off from either the bottom or top of the vessel, or both, while the operation is proceeding.

Distillation and Gasification of Carbonaceous Materials and Separating the Volatile Matter. No. 131,105.

DAVIES, W. E., of Tonypandy, South Wales.

No. 10,895; July 3, 1918.

This invention relates to the application of electricity as a means for modifying within a carbonizing chamber the volatile products obtained during the carbonization of fuel.

It consists in commingling with the volatile products, either within the carbonizing chamber or retort or in close proximity to it, gases or vapours which are at the place of introduction in contact, or have just previously been in contact, with one or more electrodes at a potential suitable for producing ionization of the gases or vapours.

In the case of carbonization, the gases or vapours are, of course, substantially free from uncombined oxygen; while when gasification on the lines of a producer is the operation, the gases contain the necessary free oxygen.

The outstanding modification of the volatile products is the increased production of ammonia when the gases introduced contain free hydrogen or steam. Introduced hydrogen also favours the formation of benzene as against toluene, whereas introduced methane is favourable to the formation of toluene.

The invention is said to be applicable to any known temperature of carbonization. The electric current used may contribute to the heating of the charge being carbonized; but this is immaterial to the invention.

The following examples are given by the patentee to illustrate the invention.

(1) Coal briquettes were carbonized in an oven under the following conditions:

Temperature within the oven	1000° C.
Coking period	7 to 9 hours.
Suction in the oven chamber	6 in. mercury.
Thickness of charge	2 ft.
Nitrogen in the coal	1·5 p.ct.
Volume of perforations in the briquettes	12 p.ct. of the whole volume.
Total space for gases in the oven chamber	50 p.ct. of the volume in the chamber.
Waste gas passed through the oven chamber per eight hours	10,000 c.ft.
Blast-furnace gas also passed through the oven chamber per eight hours	7000 c.ft.
Steam passed superheated to 950° C. introduced into the flues drawing-off the products	10 p.ct. of the air used in combustion of the heating gas.
Potential difference at electrodes	500 volts.
Current (direct)	25 amperes.

The coal briquettes contained 25 p.ct. of volatile matter, 5 to 6 p.ct. of moisture, and 4 to 6 p.ct. of ash. Under these conditions, the following yields were obtained:

Ammonia	160 to 195 lbs. of ammonium sulphate per ton.
Benzol	4 to 6 gallons per ton.
Toluol	½ to 1½ gallons per ton.
Tar	6 to 9 p.ct. by weight per ton.
Gas (450 B.Th.U.)	25,000 c.ft. per ton.
Coke	50 to 60 p.ct. per ton.

(2) In a like oven, peat was carbonized under the following conditions:

Temperature within the oven	500° C.
Coking period	3 to 5 hours.
Suction	6 in. mercury.
Thickness of briquetted peat charge	2 ft.
Steam passed into oven chamber	Three parts by weight to one part of peat.
Waste gases passed into oven chamber	Two parts by weight to one part of peat.
Potential difference at electrodes	550 volts.
Current	30 amperes.

Under these conditions there were obtained the following products;

Wax	10 p.ct. of the weight of the peat.
Acetic acid	2 " " "
Methyl alcohol	5 " " "
Ammonia	55 p.ct. of that equivalent to the nitrogen in the peat.

(3) Coal briquettes having been carbonized as described in Example 1, petroleum vapour was passed through the chamber at the end of the distillation period; the temperature of the coke being maintained at 700° to 750° C. by introducing waste gases and steam. The potential difference was 700 volts, and the current was 40 amperes. There were obtained benzene and toluene condensates varying from 400 to 800 c.c. per hour per cubic foot of coke.

(4) By proceeding as in Example 3, but maintaining the coke at 1150° C.—the potential difference being 1000 volts and the current 50 amperes—there were obtained from 1 kilo. of petroleum and about

1100 grams of steam, 320 grams of hydrogen, 100 grams of heavy hydrocarbon, and 1640 grams of carbon monoxide.

(5) The residues left on distilling the light oil obtained in a benzol recovery plant, together with 40 to 50 p.ct. of its weight of air, were passed through a heated charge of semi-distilled or coked coal maintained at a temperature of 500° to 800° C.; the potential difference being 600 volts and the current 30 amperes. Resins were produced.

(6) Fuel carbonized as described in Example 1 or 2 may be further gasified under the following conditions:

Temperature within oven	800° to 1100° C.
Suction in the oven chamber	1 to 6 in. of mercury vacuum.
Thickness of charge	2 to 4 ft.
Volume of perforations in briquettes	12 to 25 p.ct. of total volume.
Total space for gases in oven chamber	50 to 60 p.ct.
Potential difference at electrodes	500 volts.
Current	20 to 25 amperes.
Waste gases passed through the chamber	10,000 to 60,000 c.ft. per ton.
Steam at 950° C. passed into chamber	8 to 15 p.ct. by weight of air.
Air passed through chamber	80,000 to 120,000 c.ft. per ton of carbonized fuel.

The following products may be expected:

Gas, 150,000 to 250,000 c.ft. per ton, containing:

CO	18 to 27 p.ct.
H_2	10 to 15 „
CH_4	0·5 to 0·6 „
CO_2	2 to 7 „
O_2	0·2 „
N_2	50 to 55 „

The main effect of the electrification in the oven being ionization of gases or vapours and consequent chemical changes, it is sometimes profitable to introduce dust into the atmosphere in the oven chamber or flues, by blowing in it by means of the gases or vapours produced. Dust thus used should not exceed 5 p.ct. of the weight of the fuel carbonized.

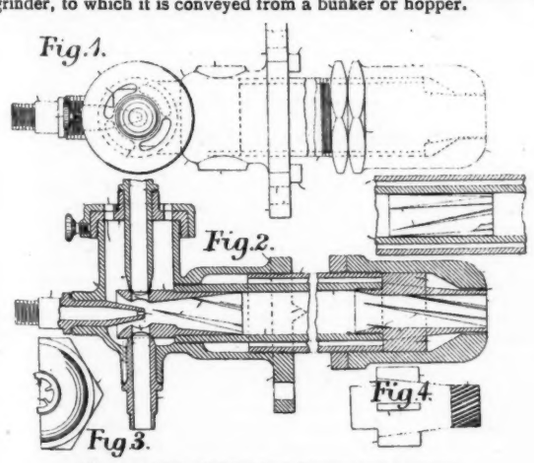
Fuel Burners or Atomizers.—No. 131,175.

NICOL, E. W. L., of Forest Hill, S.E., and SCHOFIELD, H., of Leadenhall Street, E.C.

No. 13,820; Aug. 24, 1918. No. 14,436; Sept. 5, 1918.

This combined invention relates more particularly to burner nozzles for different kinds of fuel—especially liquid fuels (whether in the form of heavy or light oil, tar, creosote, liquefied pitch, or admixtures of these) or liquid and powdered or gaseous fuel.

A feature of the invention consists in supplying the fuel through separate inlets (spaced apart); the fuels being commingled inside the tubular body of the burner itself in a finely-divided or atomized condition under the action of an injector in the rear end of the burner. Another feature consists in causing the fuel immediately after being atomized to pass through one or more sets of spiral vanes, webs, or equivalent devices, which give it a whirling motion (first in one direction and then in the other) before it finally issues from the orifice of the burner. A still further feature consists in independently controlling the feeding of the two different kinds of fuel—for instance, the powdered and the liquid fuel or oil. Of the latter, the oil-pipe may be controlled by a regulating valve between it and a tank or reservoir, while the ground or finely-divided solid fuel may be supplied through a grinder, to which it is conveyed from a bunker or hopper.



Nicol and Schofield's Fuel Burner or Atomizer.

The burner employed [illustrated] resembles an injector nozzle, into one end of the barrel of which a central jet of steam, compressed air, or gaseous impelling agent is forced, which is caused to strike and pulverize or atomize the incoming fuel fed in at right angles to the jet. Two or more fuel inlets may be provided for the purpose of mixing fuels of different kinds—for example, liquid pitch and creosote, or powdered or gaseous fuel, which may be fed continuously in any desired proportion, or intermittently. The inlets are displaced with regard to each other, either circumferentially or longitudinally of the mixing tube or barrel.

Fig. 1 is a plan of one example of the burner (with the middle barrel portion broken away). Fig. 2 is a corresponding longitudinal section (the middle portion being shown apart). Fig. 3 is an end view of the outlet of the discharge cup and nozzle. Fig. 4 is a plan of the nozzle removed from its outer cup.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Sept. 10.]

Nos. 21,399—22,015.

BANKS, G. R.—"Fittings for inverted incandescent gas-burners." No. 21,894.
BURDON, C. B.—"Valves, cocks, or taps." No. 21,877.
COVENTRY POLISH COMPANY.—"Gas and oil stoves." No. 21,752.
DOLPHIN, J.—"Means for regulating gas supply to atmospheric gas-burners." No. 21,952.
DUNSTONE, W.—See Coventry. No. 21,752.
FOWLER, J. W.—See Coventry. No. 21,752.
GREEN, E.—"Connection for joining lead pipes to brass, &c., pipes, taps, &c." No. 21,864.
HOWLETT & Co., M.—See Dolphin. No. 21,952.
JELLEY, H.—"Heating flat-irons, &c., by gas-jets." No. 21,530.
JOHANSON, G. K. V.—"Gas-meters." No. 21,655.
MOORE, A.—See Coventry. No. 21,752.
SCRIVNER, W. E.—"Suction-gas generators." No. 21,969.
SINFIELD BROS. and SINFIELD, D. & H.—"Still for distilling tar, pitch, benzol, naphtha, ammonia, and carbolic acid." No. 21,483.
SLATER, B. V.—"Friction igniting-apparatus for gas-fires, &c." No. 21,648.
SMITH, G.—See Coventry. No. 21,752.
SOC. ANON. J. COCKERILL.—"Mechanism for starting gas-engines." No. 21,888.
STEWART, J. G.—"Gas-calorimeters." No. 21,832.
SUTHERLAND, B. B.—"Inverted incandescent gas-burners." No. 21,965.
THOMAS, J.—"Incandescent gas-burners and lamps." No. 21,916.
TILLEY, J. C.—"Coin-holder for coin-freed mechanism." No. 21,947.
WELLS, J.—"Gas-producers." No. 21,478.
WILSON, W. G.—See Burdon. No. 21,877.
YATES, H. JAMES.—See Dolphin. No. 21,952.

Tralee Gas Undertaking.

Mr. Isaac Carr, of Widnes, in a report to the Tralee Urban District Council on the management of the gas-works in the town, stated that he found it lax, and that the unsatisfactory financial position was due to this circumstance. In the retort-house, he observed that the process of carbonization was being carried on in an unsatisfactory manner, and that no effective measures were adopted for keeping the ascension-pipes clean, so that a large percentage of the gas made was lost through holes in the retorts or through the mouthpiece lids. The average make per ton of coal carbonized was 7800 c.ft.; whereas an average of at least 11,000 or 12,000 c.ft. per ton could be obtained, if the workings were efficient. The present low yield of gas per ton of coal was resulting in a serious financial loss. Mr. Carr added that no attempt had been made to regulate the furnaces to the best advantage; that the pressure-guages were not in operation; that testing-taps were either missing or out of action; that pressure was excessive; and that street lamps had been left unsecured by cap or plugs—simply depending on the taps, which were subject to interference. It was highly probable the latter omission and the excessive pressure were responsible for the increased leakage. In 1916, the leakage was 3·96 p.ct.; whereas last year it was 12·39 p.ct., the net loss being, he calculated, not less than £400. The Council adopted the Gas Committee's recommendation for the acceptance of the Gas Manager's resignation, and further recommendations for rendering the works more efficient. It was decided that a gas engineer and manager be advertised for at £300 a year, rising by £10 per year to £400.

Dublin Newspaper Company's Gas Supply.

In the Chancery Division of the High Court of Ireland, before Mr. Justice Samuels, in the case of *O'Mara and Others v. the "Freeman's Journal,"* an application was made on behalf of Mr. W. D. Telford, Receiver of the Company, for directions in relation to a threat by the Alliance and Dublin Consumers' Gas Company to cut off the supply of gas to defendants' premises in the event of non-payment of the Company's bill, peremptorily presented, for £321 for gas supplied. It was pointed out that a creditors' notice to wind-up the defendant Company had been presented and filed, and that it was essential to the carrying on of the business meanwhile that the supply of gas should be continued. Mr. Finlay, Counsel for the Receiver, argued that the Gas Company were, by the threat to disconnect, attempting to gain a preferential payment of their account, to which they were not entitled. If the premises were closed-down by reason of the gas supply being cut off, it would be disastrous to all the parties interested in the defendant Company. The Receiver had intimated to the Gas Company that he would pay for any gas supplied since the date of his appointment as Receiver and Manager; and, if necessary, he would pay from day to day, or lodge a reasonable deposit to secure payment. Counsel submitted that section 39 of the Gas-Works Clauses Act, 1871, governed the matter; the effect of the section being that a gas company should not be entitled to require from an incoming tenant payment of arrears of gas rate unless the incoming tenant agreed with the former tenant to pay, or compensate him for the payment of, the arrears. Mr. Justice Samuels pointed out that this was not a case of a discontinuing tenancy. For the "Freeman's Journal" Company, it was intimated that they would consent to a direction for payment. Mr. Justice Samuels said the whole object of Mr. Telford's appointment was to enable the "Freeman's Journal" undertaking to be carried on and sold as a going concern. Cutting off the gas would annihilate that; and it was apparent that Mr. Telford ought to make the payment. It was in everybody's interest that it should be made; and he directed accordingly.

MISCELLANEOUS NEWS.

SALARY INCREASES—AN EXAMPLE.

At a Meeting of the Leeds City Council on the 3rd inst., it was decided to increase the pay of the technical and administrative staff in receipt of more than £200 per annum in accordance with the Civil Service Award—viz., £60 per year, *plus* 20 p.ct. of their present salaries. The maximum bonus to be paid is £300 a year; and the Council also agreed that the bonus should be merged in the salaries.

In the case of the Gas Department, the advances are substantial, as will be seen from the following:

	Present Salary.	New Salary.
	£	£
Engineer and General Manager . .	1000	1260
Assistant Manager.	500	660
Works Manager	365 to 375 ..	498 to 510
Mains Superintendent	395	504
Superintendent of Meter and Stove Department	350	480

Other officials received advances on a similar scale. The increase is to take effect from July 1 last.

THE SHEFFIELD GAS COMPANY NOMINEE DIRECTORS.

Report for the Year to August.

The Nominee Directors appointed by the Sheffield City Council on the Sheffield Gas Company's Board, in their report for the year ending Aug. 31, state that the working of the undertaking was an improvement on the previous year—mainly owing to the termination of the war, and the release of men and material; and to-day it is possible—as the result of sufficient labour, the renewal of plant, and the supply of coke-oven gas from Tinsley—to meet all requirments.

The coke-oven gas was first used last December; but the supply was interrupted, owing to a dispute at the colliery in March last, and during the recent South Yorkshire coal strike. The Company have entered into an agreement with the United Steel Company, Limited, for a further supply of coke-oven gas from the Orgreave Colliery. The work will be put in hand at once.

Increases of wages and reduction of hours, together with the greatly increased price of coal and all other materials required in the production of gas, led last year to three increases in price—from 2s. 9d. to 3s., 3s. to 3s. 3d., and from 3s. 3d. to 4s.; and in consequence of these advances the dividend on the "B" stock is reduced from 5 to 4 p.ct., and on the "C" stock from 5 to 3½ p.ct. These dividends are based on the present capital, which has been converted, according to statutory authority, during the year.

As a further result of the increase in the price of gas over 3s. 6d. per 1000 c.ft., the Directors will not receive any remuneration for their services—a state of affairs which, to the best of their knowledge, does not exist in any other gas company's undertaking in the country. And it is possible the Directors may, in the near future, desire their position to be reconsidered.

A very large amount has been expended in bringing the plant and machinery into good working condition; and this has been specially notable during the last half year—when it has been possible to make good the deficiencies caused by the lack of materials and labour during the war.

SHREWSBURY GAS COMPANY.

A Rejected Dividend.

As stated in a short paragraph last week, the annual accounts of the Shrewsbury Gas Light Company revealed a loss of over £2000 on the past year's working. The Directors, however, recommended the payment of a dividend of 2½ p.ct., less income-tax, for which purpose it was intended to draw upon the reserve fund. During the year there had been a decrease of 1½ p.ct. in the consumption of gas. Mention was made in the report of the fact that Mr. C. M. D. Belton had been appointed Engineer, Secretary, and Manager, in succession to Mr. W. Belton, who had been the Company's chief officer for forty years.

Addressing the proprietors at the meeting, the Chairman (Mr. J. B. Lloyd) pointed out how hard-hit the gas industry had been during the past four years, and said their Company, in particular, had suffered from a combination of adverse conditions. During the year under review they had been obliged to accept what coal the Controller would allocate to them; and this had meant bringing half their requirements from Durham, at an additional cost of over £5000 for carriage alone, besides the Company bearing the extra expenses consequent upon the poor quality of the coal. Further large advances in wages, together with a reduction of hours, had taken place in accordance with the general trend in every industry. During the twelve months to June 30, they paid nearly £6000 more in wages than in the previous year. It might be of interest to note that their wages bill for the year showed an increase of 128 p.ct. since 1914; and the cost of coal had increased 134 p.ct. during the same period. The Directors found it necessary to raise the price of gas to 4s. 7d. from September last, and again to 5s. from March. But this would not enable them to meet the increases already imposed upon them since then. In order to pay the 6s. per ton rise in coal prices, they would be compelled to advance the charge of gas again. It was some satisfaction to know that they could not be accused of profiteering. On the contrary, they were suffering from a reluctance to increase the price of their primary product except as a last resource. In order to effect economies in manufacture, the Directors had decided to remodel a portion of the works. This was long overdue, but was impossible during the war, owing to the control of all materials by the Ministry of Munitions. Now, however, though prices were very much inflated, the work could not be further postponed; and the Directors had decided upon the installation of the most up-to-date carbonizing plant available. Apart from the heavy cost of materials and labour, their prospects were bright; for gas was the fuel of the future. The question of coal conservation was in the forefront of practical politics at present; and the gas-works of the country were the true conservers of coal.

The report having been adopted, the Chairman proposed the payment of the dividend of 2½ per cent.; but to this an amendment was moved by Mr. Dixon "that no dividend be declared in respect of the year ended June 30, 1919." He appealed to the proprietors to accept this, and said he thought the Directors must have recommended a dividend under such circumstances more out of sympathy for the general shareholders than for any other reason. The amendment was carried unanimously.

ILFORD GAS COMPANY.

Mr. A. A. Johnston (in the absence of the Chairman) presided at the half-yearly meeting of the Company on the 1st inst. He said there was certainly one dominant fact respecting Government control—namely, that the regulations laid down by the different departments must be carried out, irrespective of the effect they might have on any particular company. Many of these conditions imposed great hardship, and left the impression that they had been framed without due consideration, or with insufficient knowledge, and regardless of the expense and work involved in carrying them out. The additional burden placed on an undertaking might represent a very grave increase in the cost of gas, which reacted on the general public; but this aspect did not appear to concern the Government. The seaborne coal order was a case in point. Owing to the enormous advance in the rate of freight over pre-war standards—another example of control—railborne coal was now cheaper than seaborne; and a change in present circumstances would increase the Company's costs by 6s. to 8s. per ton, additional to the general increase of 6s. Needless to say, they were making every possible effort to retain their railborne supplies. The new re-inforced concrete coke-bunkers were now well in hand; and it was hoped that they would be ready for the coming winter. In the half year under review the sale of gas had increased by 13·66 p.ct. as compared with the quantity sold during the corresponding period of 1918. Out of the sum available, the Directors recommended the payment of the statutory dividends, which would leave a balance slightly higher than the amount carried forward at the end of the December half year. It had been agreed to retain the gas for the time being at its present price; but the heavy costs would compel an advance possibly at the Christmas quarter.

Owing to the operation of the sliding-scale, this would involve a further reduction in the modest dividend. Hopes were, however, entertained that Parliament would so re-adjust conditions as to once again place the industry on a sound financial footing. Unfortunately, differences of opinion existed in the industry as to how this should be achieved; and he was afraid that some of them were prompted by somewhat parochial interests, rather than by the wider interests of the industry as a whole. He continued: "Boards of Directors have a heavy responsibility to their stockholders, and are in duty bound to do everything possible to further individual interests; but with companies, as with individuals, we cannot live entirely alone, and however much we may desire to retain or assert our absolute independence we are largely controlled by the action of others. Isolated action at this time is certain to bring increased difficulty, if not chaos, to an already overburdened industry. Unity is of vital importance; and it should not be impossible to bring apparently conflicting interests together. The evil effects of the acceptance in isolated instances of terms inimical to the interests of the industry as a whole have been sufficiently serious in the past; and no effort should be spared to avoid them now."

RICHMOND (SURREY) GAS COMPANY.

The Half-Yearly Meeting of the Company was presided over by the Chairman (Mr. Henry Pullman, J.P.), who opened his remarks by pointing out that the gross profit for the six months was £4503, which, after deducting fixed charges, left a balance of £3809 available for dividend. This, at the rate of 3¾ p.ct. per annum, would absorb £3400, and leave a balance to be carried forward of £409 in addition to the profits from the last account.

Proceeding to discuss the working during the period under review, the Chairman said that the quality of coal supplied during the half year had been of a very poor character indeed, and in some instances affected the yield and quality of gas to such an extent that the stock became so low that it was impossible to give the necessary pressure to avoid complaints. In fact, on one or two occasions, it was a question as to whether they could meet the demand even with the reduced pressure. However, new plant would shortly be brought into operation—thus giving the management a better opportunity of meeting all requirements, and, in addition, reducing the costs of this particular department. With regard to residuals, the revenue from coke sales was most gratifying, showing an increased return of £4643. This had been brought about through an extra yield from the sales, over the corresponding period of 1918, of 1 cwt. for every ton of coal carbonized, and 2 cwt. for the period ended Dec. 31 last. Extra revenue from sulphate was due partly to the increased quantity produced per ton of coal carbonized, as compared with the corresponding period of 1918. A tribute was paid by him to the services of the Engineer and General Manager (Mr. E. G. Hutchinson), who, in spite of a serious illness, from which he has now happily recovered, has discharged his duties in an exemplary manner. He said Mr. Hutchinson had also effected improvements and reforms at the works, which could not fail

to be both advantageous and far-reaching in the near future. Application was made for relief under the Temporary Increases of Charges Act; and this had been granted by the Board of Trade. It entitled the Company to pay a minimum dividend of 3¾ p.ct. per annum. Had the Company not availed themselves of the Act, the present price of gas would have eliminated the dividend altogether.

Consumers of gas would probably have to pay a comparatively high price for it, compared with pre-war figures, for some time to come—at any rate, until the price of raw material was reduced. But the price relative to the cost of other forms of light, heat, or power was still low, and the consumption of gas still economical; and the consumers were thereby benefiting. This, unfortunately, could not be said of the investing public, because relatively the dividend derived from gas stock compared with Government stock was not a profitable one. Their own dividend had fallen to 3¾ p.ct., because of the sliding-scale, and not because a higher dividend could not have been paid. There could not be much attraction of capital to gas stock at this rate of interest, when the Government found it necessary to offer 5 and 5½ p.ct. to command it. It was obvious that this financial condition could not continue to exist, if the gas industry was to continue to do so; but there was not much fear that the industry would disappear. It was far too important to the social, the commercial, and the economic requirements of the people. How important it is, he quoted figures to show.

METROPOLITAN GAS COMPANY OF MELBOURNE.

Half-Yearly Meeting.

Addressing the shareholders at the meeting at which the accounts for the first half of the present year were submitted, the Chairman (Sir John Grice) referred to the new restrictions issued by the Coal Board.* The Directors, he said, could readily appreciate the inconvenience that the restrictions would cause to consumers; but it had to be remembered that, the previous regulations not having effected a sufficient reduction in the consumption of gas—in point of fact, having only lessened the output by 15 p.ct., as compared with last year—it became imperative that the Coal Board should take some drastic action to prevent an otherwise certain total collapse within a few days of the gas supply to Melbourne and suburbs. Should this have happened, it had to be borne in mind that hospitals and other institutions, both public and private, including those in which returned soldiers were receiving treatment, would have been seriously embarrassed in carrying on their functions; and the Directors felt sure that, even at the expense of inconvenience to themselves, the gas consumers would be prepared to take any step to avert such a calamity. The fact also must not be overlooked that a reduction in the gas service was preferable to a complete cessation of the supply, upon which probably 500,000 persons in Melbourne were dependent for the cooking of their daily food. He desired to emphasize the fact that the alarmingly small quantity of coal now remaining in the Company's hands provided a very inadequate margin of safety for the protection of the gas supply. It was to be sincerely hoped, however, that the situation would shortly improve sufficiently to enable the Coal Board to permit of an improved and less restricted supply; and in the meantime the Directors could only ask the public to give its whole-hearted support to the efforts of the Coal Board to deal with the present emergency. The Directors were aware that, commenting on the difficulty of maintaining a full supply of gas over the period of a prolonged strike, the question was frequently asked why the Gas Company did not maintain at all times a larger reserve of coal. The answer was that, despite every effort during the past few years to increase the quantity of coal in stock to such a reserve as the Directors would regard as a reasonable margin of safety—viz., say 60,000 tons—it had been found a matter of absolute impossibility to do so. As far back as February, 1915, the Directors acquired a reserve of nearly 59,000 tons; and had it been possible to maintain and increase this reserve, they would gladly have done so. However, in the latter half of 1917 there was a coal strike at Newcastle, and as a result of this the quantity of coal in stock fell to a total of under 6000 tons. No effort had been spared since then to accumulate a satisfactory stock of coal, but the Directors had been unable to do so. The difficulty experienced prior to the present strike was due to the shortage of tonnage on the coast; and the Coal Board, who had since controlled the situation, had been compelled to limit the quantity of coal allocated to all consumers, including the Metropolitan Gas Company.

Mr. Dickson said it was very difficult to comply with the regulations. The man who had been thrifty last year would have to cut-down consumption to a point which would make it practically impossible for him to carry on; while the man who used much gas last year would be able to get on comfortably. In place of the present regulations, the Board might fix a certain number of cubic feet per head, that could be used; and people would then know how they stood.

The Chairman said Mr. Dickson had made a very good suggestion; but it would necessitate an amendment of the regulations.

As to the business of the half year, the Chairman pointed out that the sales of gas amounted to 1,765,000 c.ft., compared with 1,659,000 c.ft. for the corresponding period of last year, or an increase of 6¼ p.ct. This was very satisfactory, especially when it was taken into consideration that the restrictions on the use of gas between the hours of 8 a.m. and 5 p.m., which came into operation on June 5 last, had of course resulted in decreasing the daily quantity of gas issued from the works. The receipts from residual products, £110,013, compared with £115,969 for the corresponding period of last year. Coke showed an increase of £6031, and sulphate of ammonia a decrease of £13,946, as compared with June, 1918. The large rise in the price of sulphate of ammonia during the war period was much reduced. A further and most serious industrial disturbance had occurred in the last few weeks, which had rendered it impossible for the Company to obtain adequate deliveries of coal; and the operations of the Company were now in peril, notwithstanding the enormous increase in the cost of coal brought overland from Newcastle.

* These restrictions make it compulsory for consumers to use not more than half the average daily amount of gas that they used during the corresponding period of 1918.

The "Melbourne Age," in their issue dated July 22, said: Diminished earnings are disclosed by the financial statements of the Metropolitan Gas Company, dealing with the first half of the current year. The total, £88,658 net, is £9511 less than the profit shown in the accounts for the January-June period of last year, and £18,371 smaller than that revealed by the balance on Dec. 31 last. In addition to declaring a dividend of 6s. 6d., equal to 13 p.ct. per annum on the face value of the shares, and to a little more than 7 p.ct. on present market quotations, the Board have transferred to the reserve £15,000, to meter renewal fund £7000, and to gas-stoves, &c., account £1500. The dividend absorbs £65,000; and the balance, £158, is added to the sum brought forward (£77,577), making a total of £77,735 remaining at the credit of profit and loss. Some comparisons are subjoined:

	June, 1917.	June, 1918.	June, 1919.
	£	£	£
Sales of gas	352,997	372,759	400,812
Bye-products	98,362	115,969	110,015
Total revenue	451,366	488,734	510,835
Cost of manufacture and distribution	275,303	304,264	332,728
Management	25,821	26,449	34,003
Net profit	95,255	98,169	88,658

The capital account shows expenditure of £2,552,759. The full issue authorized (£1,000,000) has now been made. There are debentures for £993,500, and premium capital, £584,210, of which £25,880 was received during the half year under review; there being a credit balance on this account of £24,951, as against £7929 a year earlier.

COAL CONTROL AND GAS PRICES.

A Gas Company Chairman's Protest.

The following letter, showing the effect upon the finances of the Watford Gas and Coke Company (and therefore, of course, upon the price of gas) of the Seaborne Coal Order, has been addressed by Mr. E. J. Slinn (the Chairman) to the "West Herts Observer."

May I ask for a small part of your space, to bring before the gas consumers of Watford and district a recent order of the Coal Controller, and the serious effect it will have if carried out on the price of gas within our area of supply? The whole of the gas undertakings in the South of England, whether situated on the coast or inland like ourselves, have been informed that all supplies of coal made to them must be carried by sea, instead of being sent direct from the pit-mouth by rail, as heretofore.

No objection could be taken to this if the cost of transit by sea did not exceed that by rail; but the Shipping Controller, for some reason known to the Shipping Control Board alone, has fixed the cost of freightage, in our case, at 11s. 6d. per ton above the cost of transit by rail; so that our coal will now cost us 22s. 1d. per ton for transit alone, or, if the 6s. per ton recently added to the price of coal be included, a total cost of 49s. 6d. per ton. These figures are, of course, subject to alteration by the Shipping Control at any moment. Only a week or so ago 1s. per ton was taken off, and put on again within the course of a few days.

There can be no plea that a saving is being made, or that there is a scarcity of locomotives or wagons. The coal my Company is now receiving is raised in the Durham pits, in some instances 20 miles from the nearest port. It is loaded into wagons at the pit-head, the train drawn to the Tyne (already seriously congested) and the coal transferred to steamers. Brought into the Port of London, far more congested even than the Tyne, it is again transferred to wagons to be run over the terminals of the London and North-Western Railway, congesting railway traffic where it can least stand it, and eventually reaches Watford. The whole scheme is so utterly ludicrous, as a business proposition, that one can only imagine it has been devised for the express purpose of putting money into the pockets of the shipping companies.

With its direct effect on my Company and our consumers, I am more seriously concerned. A sum of 11s. 6d. per ton added to the cost of transit of our coal—and I wish to make it clear that this is quite distinct and apart from the 6s. per ton recently added to the price of coal—means, if persisted in, an increase of 1s. per 1000 c.ft. on the price of our gas. I may add, for the benefit of the uninitiated, that it is not simply a question of passing on the extra cost to the consumer, as for every penny for which the price of gas is raised, our shareholders' dividend must, by Act of Parliament, be reduced 2s. 6d. p.ct.

Here, therefore, it is a clear case of forcing-up prices by Government control, for the only apparent purpose of loading the profits of the shippers. I am sending a copy of this letter to our Member of Parliament, asking him to take up the matter in the House; and I wish the public, and our consumers and shareholders in Watford, to understand the effect an order such as this has upon my Company, and to ask for their active interest and support in giving publicity to such an outrageous action on the part of a Government Department.

Reserve Fund Called upon at Burnley.—A statement by the Borough Treasurer of Burnley records that the loss on the gas-works for the year, amounting to £15,688, has been provided for by taking the whole of the reserve fund of £11,650 and the unallocated profits for the previous year, amounting to £3460, leaving a balance of £578 to be carried forward. The capital expenditure during the year includes £397; and allowances to employees on active service for the past two years had been £1010 and £409 respectively.

MACCLESFIELD GAS-WORKS RESULTS.

Reporting to the Gas Committee upon the working of the Macclesfield Corporation Gas Department for the year ended March 31 last, Mr. F. W. J. Belton (the Engineer and Manager) says the Fuel Rationing Order resulted in a decrease of 1·24 p.ct. in the consumption of gas. The prepayment system of supply now amounts to 35·13 p.ct. of the whole consumption, and shows an increase of 4·3 p.ct. over the previous year's consumption. The total quantity of gas sold during the twelve months was 187,218,147 c.ft.; and the average price received was 3s. 0·02d. per 1000 c.ft.—the net cost being 2s. 8·17d. The make of gas per ton of coal carbonized was 19,330 c.ft.; and the gas sold per ton of material used, 17,980 c.ft.

The gross profits of the year amounted to £6085; and after paying £3456 interest and sinking fund, there remained a net profit of £2628. It was proposed by the Council that this sum should be carried to the maintenance fund. The capital account (total amount expended) now stands at £94,000; and the gas-works debt, after deducting stock redeemed, stands at £62,253, which is represented by 3¾ p.ct. stock issued under the Macclesfield Corporation Act, 1882.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Sept.* 15.

Pitch is the main item of interest in the London tar products market; inquiries being good, and the price being well over 75s. net per ton f.o.b. makers' works for the best brands. Creosote is also in a strong position at 6d. to 6½d. net in bulk at producers' works. Motor benzol is gaining in popularity. Pure toluol and pure benzol are each about 2s. 9d. net per gallon filled into buyers' packages. Solvent naphtha is worth 2s. 4d. to 2s. 5d. net in bulk.

The position of sulphate of ammonia is unchanged.

Tar Products in the Provinces.

Sept. 15

The average values for gas-works products during the week were: Gas-works coal tar, 37s. 3d. to 42s. 3d. Pitch, East Coast, 66s. to 67s. 6d. per ton f.a.s.; West Coast—Manchester, 55s. to 57s. 6d.; Liverpool, 55s. to 57s. 6d., Clyde, 65s. to 70s. nominal. Benzol 90 p ct., North, 1s. 8d. to 1s. 10d.; crude 65 p.c. at 120° C., 11½d. to 1s. 0½d. naked at makers' works; 50-90 p.ct. naked, North, 1s. 8d. to 1s. 10d. Toluol, naked, North, 2s. to 2s. 1d. nominal. Coal tar crude naphtha in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 2s. to 2s. 2d. Heavy naphtha, North, 2s. 1d. to 2s. 3d. Creosote, in bulk, North, liquid, 5d. to 5½d.; salty, 4½d. to 4¾d. Heavy oils, in bulk, North, 6d. to 6½d. Carbolic acid, 60 p.ct., 1s. 6d. to 1s. 6½d. Naphthalene, £15 to £17 10s.; salts, £4 10s. to £6, bags included. Anthracene, "A" quality, 7¼d. to 7½d. per minimum 40 p.ct.

FROM A MARKET CORRESPONDENT.

Tar Products.

Generally there is little change in conditions; but prices continue firm, and there is no anxiety to sell, as general opinion favours higher prices. Coal supplies are rather better; but Northern coke-ovens are not yet working up to normal. This, of course, helps in keeping-down the supply of products. Nationalization is still to the fore—among the labour interests anyway; and the possibility of a national coal strike must not be lost sight of. In South Wales, however, there will be several new batteries of bye-product ovens working in a few weeks time; and the output of bye-products is to be considerably increased during the next twelve months. Pitch is very strong; and up to 85s. per ton is reported in London for forward shipment. Provincial rates are again advanced; but sellers do not seem anxious to book orders, even at the higher level, as they anticipate general scarcity of fuel during the winter, when pitch might easily fetch much more. Crude tars are without change. Naphthalenes show no material change, and, if anything, are dull at the old price. In naphthas, a slight scarcity is reported from the North in solvent, and prices are very firm. Crude and heavy are unchanged. Carbolic acid has provided no special feature this week; and there is no change in the position of benzol. Efforts are still being made to create a regular and reliable system of supply for the motor trade; and much is being done to extend its use in this direction. The market is a large one, limited only by the competition of petrol. Creosote prices are well maintained, on a good demand from the oil-fuel trade; there being, of course, a considerable reduction in outputs. Higher prices are being looked for in some quarters. Others, however, are against this view, holding that the loss of the American trade—which accounted for many millions of gallons in pre-war days—has to be taken into account. This, of course, may return, but not until shipping conditions improve. Other products are without change.

The range of quotations is as follows:

Benzol: 90% London 2s. to 2s. 2d., North, 1s. 11d. to 2s.; 50-90% 1s. 9d. to 2s. London, 1s. 9½d. North; crude 60-65% 1s. 5d. to 1s. 7d.; pure, 3s. per gallon naked.

Carbolic Acid: Crude 60's 2s. per gallon nominal; crystals, 40%, 10d. per lb. asked.

Crude Tar: London, 47s. to 50s.; Midlands, 44s. to 46s.; North, 44s. 6d. per ton *ex* works.

Pitch: London, 77s. 6d. to 82s. 6d. per ton; East Coast, 67s. 6d. to

USE Simmance's

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instead of WATER-TUBE GAUGES and

"READ THE PRESSURE BY THE POINTER."

No liquid to evaporate and no levels to adjust.

No glasses to break and nothing to clean.

Direct reading, Open scale, Any range (Pressure, Vacuum, or Combination).

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Agents: Australia—FYVIE & STEWART, 360, Collins St., Melbourne; Canada—W. P. ROPER, 502, Merchants' Bank Building, Montreal.

72s. 6d. per ton; West Coast, 60s. to 65s., with Manchester 62s. 6d. per ton and Glasgow 67s. 6d. per ton; South Wales, 64s. to 68s. per ton.

Solvent Naphtha: London, 2s. 5d. Provinces, average 2s. 3d. per gallon.

Crude Naphtha: Naked, 10d. per gallon.

Heavy Naphtha: 2s. 5d. per gallon.

Naphthalene: Refined, £16 to £18 per ton nominal; crude, £5 10s. to £11, according to quality.

Toluol: Naked, 2s. 9d. per gallon nominal. North, 2s. 7d.

Creosote: London, 7¼d.; North, 5¾d. to 6¼d.; heavy oil, 6d. per gallon in bulk.

Anthracene: 40-45%, 7d. to 7½d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

Aniline Oil: 1s. 2d. per lb.

Cresylic Acid: 95%, 2s. 4d. to 2s. 5d.; 97-99%, 2s. 7d. to 2s. 8d. *ex* works London, f.o.b. other ports.

Sulphate of Ammonia.

There is nothing fresh to report in sulphate this week. The new scale of prices seems to have been fairly well accepted, except by the farmer; but even he can have nothing to say about the justice of the increase. In America a rather better tendency is to be noted; most of the producers being sold out for September, and having plenty of orders for October. Export inquiries are fairly steady; but as most of these are for immediate delivery, they cannot be accepted. A few forward sales have been made.

Messrs. R. & J. Dempster, Ltd., of Manchester, forward a copy of a small war souvenir brochure which they are sending out to their friends in the hope that it may prove useful for ascertaining when any of the principal events of the last few years occurred.

The Galashiels Town Council has decided to defer the question of automatic street lighting; and during the ensuing winter the ordinary system of gas lighting will be maintained. It was proposed to instal the "A. & M." [Messrs. Alder and Mackay's] appliances.

The workmen of the Hoboken (Antwerp) Gas-Works have gone on strike—a Reuter's telegram reports—on a demand for the dismissal of three workmen belonging to a Catholic trade union being refused by the management. It is feared that the movement will extend to the other works which supply gas to the city; so that Antwerp would be without gas.

One of the most interesting stands in the industrial section of the show of the Warwickshire Agricultural Society was that of the Leamington Priors Gas Company, who displayed specimens of the latest fires, water heaters, &c. The Company are now installing a sulphate of ammonia plant at the gas-works; and Mr. Ettle, an agricultural expert of the Sulphate of Ammonia Association, was in attendance at the stand to give advice and information on the use of this fertilizer.

Alliance and Dublin Consumers' Gas Company.

The Directors, in their report for the half year ended June 30, say that the accounts show a profit on the revenue account of £32,936; and, after providing for interest on the debenture stock and temporary loans, there remains a sum of £24,501, to which must be added the sum brought forward from last account, and a credit from income-tax account, making a total of £42,595. In the previous report, as well as in the one relating to June 30, 1918, reference was made to the Company's application to the Board of Trade for an Order under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918. The Order has now been received; but, unfortunately, it only authorizes the increased dividend for the half year ended June 30 last. The Directors regret that they have been unable to obtain permission to pay the arrears of dividend, especially as the Company's application was made as far back as Aug. 10, 1918. Before the increased dividend can be paid, certain conditions imposed by the recent Order have still to be complied with; but, assuming the Board of Trade will act promptly in the matter and dispose of these in time, the Directors propose to recommend the declaration of a dividend at the rate of £3 6s. 3d. p.ct. per annum, less income-tax, on the consolidated ordinary stock. This will absorb £25,702, after which a balance of £16,892 will remain to be carried to the next account.

Crediton Urban Council and the Gas Company.—Last Wednesday application was made to Mr. Justice Greer (Vacation Judge) on behalf of the Crediton Urban District Council for leave to serve notice of motion. Mr. Pocock stated that the writ which had been issued claimed an injunction restraining defendants, the local Gas Company, from ceasing to supply the Council with gas. The gas had been cut off from Aug. 31. His Lordship granted leave to serve notice of motion for to-morrow [Wednesday].

Minimum Consumption for Slot-Meter Users.—At a meeting of the Swadlincote Urban District Council, Mr. W. Oakeley moved the rescinding of a resolution relative to the charge to people who did not consume more than a certain quantity of gas. The resolution laid it down that slot-meter consumers should be charged an extra 6d. where not more than 2000 c.ft. of gas had been consumed in the quarter. Mr. Oakeley contended that it was not right to appeal to people to economize in gas, and then fine them for not using more than 2s. 3d. worth in the quarter. Those who had only consumed gas amounting to 2s. 2d. offered to pay the other 1d.; but they were told that this was not according to the rule. The total number of slot meters in use in the Swadlincote district was 3500; and the average consumption was 8000 c.ft. per annum. Before the war, a slot meter cost £1 16s. 6d.; but this figure had now been increased to £3 12s. 11d. The cost of fittings prior to the war was £3 10s.; while the amount was now £7 10s. per meter. Some of the people whose meters had been removed did not consume 500 c.ft. of gas in six months. Eventually the resolution to rescind was carried.

Gas and the Housing Problem.

PENDING the necessary provision of new houses, the best has to be made of existing accommodation. The essential economy of space is secured by the use of the ideal Cookers in present circumstances — Main's "Kent," "Sussex" and "Surrey." These efficient and compact cookers embody all recent improvements and are designed with a view to securing the minimum cost for maintenance.

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WORKS: Gothic Works, EDMONTON, N.18; Gothic Ironworks, FALKIRK; and Gothic Works, BIRMINGHAM.
SHOW-ROOMS AND BRANCHES: 25, Princes Street, Oxford Circus, W. 1; 82, Gordon Street, GLASGOW; 18, Severn Street, Deansgate, MANCHESTER; 97, Millfield, BELFAST; 333, Queen Street, MELBOURNE.

Gas Prices and the Rates at Chard.—When a proposal was made in the Chard Town Council to increase the price of gas from 5s. to 5s. 10d. per 1000 c.ft., there was strong opposition; the feeling of some of the members being that the increased cost should be put on the rates. It was, however, explained that this course would be necessary to some extent, even with the suggested higher price for gas.

Vertical Retorts for Burton.—The Town Clerk has reported to the Burton-on-Trent Corporation Gas Committee that, pursuant to the Committee's instructions, he applied to the Ministry of Health for sanction for the Corporation to borrow the sum of £65,500 for the installation of vertical retorts at the gas-works. He submitted sanctions to the borrowing of amounts of £47,825 and £17,675; the periods allowed for repayment being twenty years and fifteen years respectively.

Gas Rationing in Berlin.—According to an Exchange telegram from Amsterdam on Monday last week, the Berlin authorities owing to coal shortage have decided to extend the number of gasless hours, and shops and warehouses may in future use only 50 p.ct. of the quantity of gas and coals used in the last quarter of 1916. The lighting of show-cases and the use of lifts in private houses is forbidden—exceptions only being made in the cases of public buildings, hospitals, and chemists' shops.

Causes of a Price Increase at Dunfermline.—Dealing with the reasons for an increase of 1s. 2d. per 1000 c.ft. in the price of gas at Dunfermline, ex-Provost Harley explained to the members of the Town Council that the management of the gas-works could only be held responsible for 2d. of this increase. The recent disastrous fire that had destroyed so much coke accounted for an increase of 6d.; while another 6d. had been added as a result of the Government action in raising the price of coal 6s. per ton. He hoped the public would note the explanation, and not attribute more than 2d. of the total advance to the increased expenses of management.

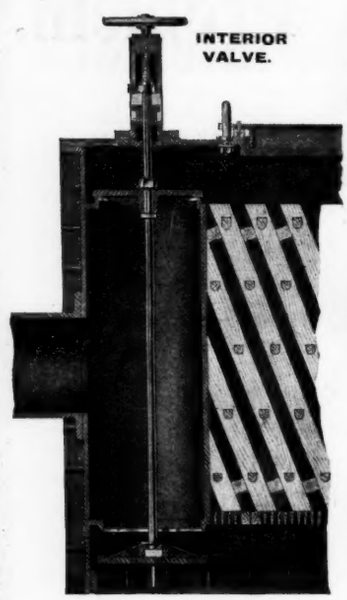
Stafford Gas Prices.—The Stafford Town Council have now adopted a report of the Gas Committee, who re-considered their decision to raise the price of gas, and again came to the conclusion that they were justified in increasing the charges in view of the continued advance in the cost of production. After the September quarter, the new prices will be from 4s. 6d. per 1000 c.ft. for any quantity not exceeding 20,000 c.ft. per quarter, down to 3s. 3d. for any quantity exceeding 3,000,000 c.ft. per quarter. In lieu of doubling the hire charges for gas cookers and fires, the Council have decided that consumers be required to pay the cost of maintenance and repairs; but they will be relieved from hire charges when the same gas cooker or fire has been in continuous use by a consumer for at least ten years. These rates will be subject to 5 p.ct. discount in future, instead of the old rates of 2½ p.ct. ranging up to 33⅓ p.ct. according to the quantity consumed. The 4s. 6d. rate for gas is based on the saving which it is expected the new retorts will effect; otherwise the price would have been nearer 5s. per 1000 c.ft.

Price of Gas at Dronfield.—The Dronfield Urban District Council have decided to object to the local Gas Company's application for power to raise their maximum charge for gas to 7s. per 1000 c.ft. The ground of their objection is the poorness in quality and variation in pressure of the gas supplied.

An Offer of Indian Coal.—"Anglo-Indian," writing to "The Times," says: At the present time the enclosed cutting from "Capital," the leading Calcutta financial newspaper, of Aug. 8 may not be without interest to your readers. "It is reported that the Government of India have cabled to the home Government and offered to supply any quantity of Indian coal for which tonnage can be provided." Indian coal is quite serviceable for all household purposes; while the better qualities are used for raising steam, and the best kinds could be put on the home market at prices far below those of English coal to-day,

Coal and Other Costs at Falmouth.—A letter from the Gas Company was read at the meeting of the Falmouth Town Council last Tuesday, enclosing a copy of an application made to the Board of Trade for permission to increase the price of gas 1s. 6d. per 1000 c.ft. A statement was submitted in support of this. The total profit for the year ended June 30 was £1135, of which the profit from Dec. 31, 1918, was £186. The Council resolved to send a letter to the Board of Trade pointing out the serious position caused by the Controller requesting the Company to obtain seaborne coal, entailing an extra cost of 9s. per ton, or over £2000, and asking that arrangements be made allocating railborne coal for the purpose. While appreciating the increased cost of production, the Council say they rely upon the Board of Trade having due regard to the interests of the consumer in deciding the amount of increase in the price of gas to be sanctioned.

Reconstruction Scheme Postponed at Wigan.—In submitting the minutes of the Gas Committee at a meeting of the Wigan County Borough Council on Wednesday last, Mr. H. Farr said it had been resolved by the Committee that, in view of the present high cost of installing vertical retorts, and to the financial loss which would accrue to the department, it would be inadvisable to proceed with the scheme for the present. The Gas Committee had decided to postpone the reconstruction of the carbonizing plant. It was felt that the time was not opportune for launching into an expenditure of anything between £80,000 and £100,000. If they embarked on a scheme of vertical retorts to produce 2,000,000 c.ft. of gas per day, they would find that the great saving they expected would come through the adoption of labour-saving methods would be absorbed in capital charges. Further than this, the advantages which they hoped would accrue from residuals and the increased quantity of gas produced per ton of coal would be more than absorbed by the loss they would have owing to the decreased amount of coke produced. The scheme had not been abandoned; but it would be a mistake to launch out on it in connection with a concern on which £400,000 had already been spent without making sure they would get a tangible return. After a lengthy discussion, the minutes were adopted.



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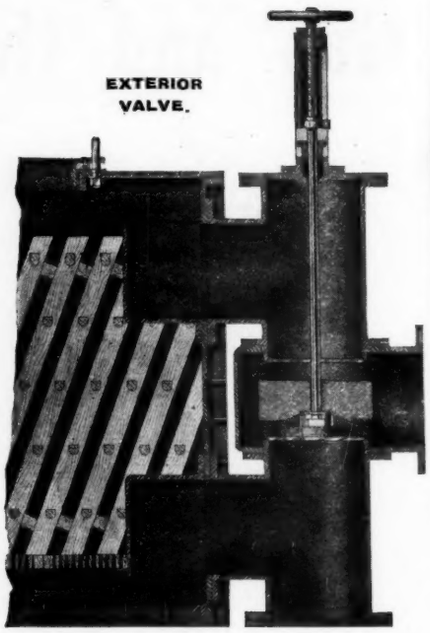

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Carlisle Gas-Works Results.

The report on the working of the Carlisle Corporation gas undertaking for the year ended March 31, which was presented at last week's meeting of the City Council, showed that there had been a gross profit of £14,277 and a net profit of £11,554, which, after deducting the adverse balance of £3762 at March 31, 1918, left a net credit balance at the end of the year of £7792. Owing to the operation of the Household Fuel and Lighting Order, there had been a decrease in the make of gas of nearly 11 million c.ft., while the consumption showed a decrease on the previous year of 16 million c.ft. The average price of gas last year was 3s. 9d. per 1000 c.ft., as compared with 2s. 8d. the previous year; and the increase in the price brought in additional revenue to the amount of £19,618. Mr. J. P. Buck, the Chairman of the Gas Committee, stated that last year coal cost £6000 more than in the previous year; but £3910 was saved on oil, making the net increase in the cost of raw material £2090. Against this, however, they had to set the sum of £4700 more received for coke last year than in the previous year.

Gas Supply Suspended.—Owing to coal shortage, the gas supply in Bagnalstown (co. Carlow) was suspended last week, causing serious inconvenience to household and industrial interests.

Walsall Gas Undertaking.—The Walsall Corporation have appointed a Sub-Committee to investigate the present position, management, and finances of the gas undertaking.

Hire Terms for Gas-Stoves.—It is stated that as from Oct. 1 the Gas Light and Coke Company have decided to increase by 50 p.ct. the rental of all gas-stoves now held on hire from the Company, and not to hire out any more new stoves. If, says the "Daily Mail," consumers want additional stoves, they must buy them for cash or on hire-purchase terms. A concession is to be made to present hirers. They will be allowed to buy their stoves at four times the new annual rental. A stove now rented at 3s. per annum, to be raised to 4s. 6d., can thus be bought for 18s. The price of such a stove in the market to-day would be £2 18s. 6d.

A Carburetted Hydrogen Plant for Tiverton.—A report has been presented by the Lighting Committee to the Tiverton Town Council on the installation of a carburetted hydrogen gas plant, at a cost of £1600. The Committee, with a view to increasing the pressure on the mains, chiefly for the supply in the western district, recommended the installation of a booster, at a cost of £220. The Committee had also considered the possibility of utilizing the surplus water power in the River Exe for the purpose of electric lighting. In view, however, of the saving in the consumption of coal which would be effected by the installation of the carburetted hydrogen plant, and the possibility of the Council deciding to instal an electric lighting system for the town, the Committee did not think it advisable to proceed with the water-power scheme. The report was adopted.

Maryborough (Queensland) Gas Company.—The profits of the Company for the half year ended June 30 (after making provision for bad debts, repairs and renewals, depreciation, working expenses, and contingencies, and including the balance brought forward) amounted to £1284. The payment of the usual dividend of 6 p.ct. per annum, free of income-tax, left £46 to be carried to the next account.

Government Stocks of Non-Ferrous Materials.—The following particulars are published of the stocks (exclusive of old metal and scrap) in this country in possession of the Minister of Munitions on Sept. 1: Copper, 28,049 tons; spelter G.O.B., 20,041 tons; spelter, refined, 10,963 tons; aluminium, 10,232 tons; soft pig lead, 84,057 tons; nickel, 2374 tons; and antimony regulus, 3386 tons. A proportion of these stocks is already sold to the trade for forward delivery.

Bexhill Water and Gas Company's Accounts.—The accounts of the Bexhill Water and Gas Company for the half year ended June 30 show a balance at credit of profit and loss account available for distribution of £5171. The Directors recommend that a dividend be declared for the six months at the rate of 4 p.ct. per annum on the capital of £34,000 authorized by the Acts of 1885 and 1892, at the rate of £2 16s. p.ct. per annum on the capital of £123,720 authorized by the Act of 1896, Order of 1901, and Act of 1904, and at the rate of 5 p.ct. per annum on the preference share capital, less income-tax. This, with provision for income-tax, will absorb £2894 leaving £2276 to be carried forward. The result of the working of the Company during the half year proves that the maximum charges for water and gas allowed by the Company's Acts are insufficient to meet the continued heavy increase in wages and fuel, particularly the 6s. per ton increase on cost of coal fixed by the Government as from July 21. The Directors have therefore decided to apply to the Board of Trade for an increase in such maximum charges under the authority of the Statutory Undertakings (Temporary Increase of Charges) Act.

A 5000 Miles Benzol Test on a Motor Cycle Combination.—Last Thursday week a 4 H.P. chain-driven "Triumph" motor cycle combination started from the head offices of the Automobile Association, Whitcomb Street, W.C., for a 5000 miles test, under ordinary touring conditions, to show that approved benzol is a satisfactory fuel for motor cycles; also for cars having air-cooled engines. As in the case of the 16 H.P. "Sunbeam" car which is now undergoing a similar road test of 10,000 miles, this test is being carried out under conditions which will preclude all possibility of doubt or criticism as to its genuineness, and the finality of its results. The machine came straight from the makers, and the engine was taken down at the works before the test and carefully examined by a competent authority. During the run an exact record will be taken of consistency in running, average fuel consumption, and at the end of the test the engine will again be dismantled and thoroughly examined. At the suggestion of the Institute of Automobile Engineers, Mr. R. S. Fox has been appointed as official examiner, while the benzol used throughout the run will be the "N.B.A." brand of approved specification. A similar machine, also running on approved benzol, accompanies the motor cycle under test.

No Cooker Complete without a Plate Rack

Supplied complete with white enamelled splasher, the whole forms an indispensable adjunct to every modern gas-cooker.

——and no Plate Rack so complete as Richmond's.

Since our introduction of this attachment it has become of universal manufacture, but the initiative still rests with us. Ours is the only pattern (protected by patent) that holds plates in a vertical position so all are equally and thoroughly heated—not merely the bottom one or two as in plates stood in a pile.

A Plate Rack does not burn gas, but, by the convenience it provides, it induces a more regular use of the Cooker.

THE RICHMOND GAS STOVE & METER CO., Ltd.,

WARRINGTON and LONDON.

The Parliamentary Committee of the Glasgow Corporation have agreed to recommend that the proposal to obtain powers relating to high-pressure gas-meters be not further proceeded with.

"The word economy should not arise in connection with public lighting," was the remark of a Hemsworth (near Bradford) Urban District Councillor, when a discussion arose as to whether the gas-lamps should be left lit all through the night or extinguished at 10 or 11 o'clock. There were divergencies of opinion; but eventually it was decided that all lamps should be extinguished at 11 o'clock.

The Walsall Corporation Gas Committee report that a contract to take the ammoniacal liquor produced at the gas-works recently expired; and the Engineer (Mr. B. W. Smith) reported as to the erection of a sulphate plant. The Committee, having inspected sulphate plants at Leicester and Coventry, recommend that the tender of Messrs. W. C. Holmes & Co., of Huddersfield, be accepted for supplying and erecting at the Pleck gas-works a sulphate of ammonia plant to enable the ammoniacal liquor to be dealt with at the gas-works.

It is reported on good authority, says the Workington correspondent of "The Times," that the Cumberland Coal, Power, and Chemical Company, of which Mr. Barton, late Chairman of the Nitrogen Production and Carbide Company, is head, have acquired the Oughterside Colliery and Bye-Product Coke Ovens.

The Directors of the Shrewsbury Gaslight Company, on the advice of their Engineer (Mr. C. M. D. Belton), have placed an order with Messrs. R. Dempster & Sons, Ltd., of Elland, for a three-quarter million vertical retort plant, on the Dempster-Toogood system—complete, with coal-handling plant so arranged as to utilize an existing horizontal retort-house with the roof suitably lifted.

The first two numbers are to hand of a new publication entitled the "Fertilizer and Feeding-Stuffs Journal." It is to published fortnightly, price 4d., at No. 38, Shoe Lane, E.C. Being intended for trade circulation only, the market reports will naturally be a feature; and in these, of course, sulphate of ammonia will find a place. The paper is well got up; and will, no doubt, be welcomed by the manufacturers, importers, and merchants whose interests it will serve.

STOCK MARKET REPORT.

THE Stock Exchange has had a fairly good week, but not quite so satisfactory in all respects as the week before. The opening day was firm, and bore promise of accumulating strength; but before long it became evident that rising prices were met by a disposition to realize profits promptly and make certain. Thus checked, some markets of importance relapsed into dulness, and did not emancipate themselves from it for the rest of the week.

The gilt-edged market was one of these. Home Government issues advanced at first, but failed to maintain their position for the most part, though the 5 p.ct. Loan closed unchanged at 94⅞. The other Loans and Bonds were down, and Consols rather easier at 50⅝. Home Rails took much the same course; the early initial firmness being undermined by subsequent labour apprehension. Canadians were in better favour, and Argentines did well.

The Foreign Market had fewer strong points. The further fall in the Exchange value of the franc was fatal to French Loans, and Japanese and Chilian were easy. There was a better inquiry for Russians, and Brazilians were firm.

In the Miscellaneous Market, movements in Rubber were irregular and became very quiet; but Oil was strong and very active. Shipping generally was firm, and P. and O. in particular jumped up 40 points. Another equally startling bound was in Price's Candles.

Business in the Gas Market was in the aggregate much on a level with that of the week before, and, as then, was for the most part restricted to a couple of largest companies. It seems as if the holiday season, which used to be identified with August, is still going strong. The general tendency showed firmness maintained. In the Metropolitan Companies, Gas Light and Coke changed hands at higher figures, South Metropolitan did the like, with a rise of one in the quotation, and Commercial had a similar rise. A large number of Suburban and Provincial were quoted *ex div.*, with a turn in favour of the companies. Imperial Continental was active and firm at prices between 128 and 130. Primativas were steady.

Bargains done for cash during the week were as follows: On Monday, Bombay 5¾, British 28½, 28¾, Gas Light ordinary 59, 59¾, 60, 60¼, 60½, 60¾, ditto preference 66¼, ditto debenture 53¼, Imperial Continental 128, 128½, Primitiva 31s. 3d., 35s., ditto preference 66s. 3d., 68s. 9d., South Metropolitan 60, 61. On Tuesday, Gas Light ordinary 60, 61, Imperial Continental 128, 128½, 129¼, 130, Primitiva 33s. 9d., ditto preference, 68s. 3d., 68s. 9d., ditto debenture 72⅜, Tottenham "B" 51½. On Wednesday, Brighton and Hove Original 128 *cum div.*, Bristol 79¾, Gas Light preference 65, 66½, Imperial Continental 128½, 129½, 129¾, 130. Primitiva 33s. 9d., ditto preference 68s. 9d. On Thursday, British 27½, 29, ditto debenture 66½, Gas Light ordinary 60, ditto maximum 48, ditto preference 56½, ditto debenture 52½, Imperial Continental 128½, 129½, 129¾, Primitiva preference 67s. 6d., San Paulo preference 7⅜, South Metropolitan 60¾, 61. On Friday, Brighton and Hove original 123 *ex div.*, ditto ordinary 84 *ex div.*, Croydon "B" 109, 109 7/16, Gas Light ordinary 59⅜, 60¼, Imperial Continental 128, 128½, 129½, Primitiva 33s., 33s. 9d., ditto preference 66s. 3d., 67s. 6d. 68s. 9d. South Metropolitan 60, 60½.

In the Money Market, there was a strong demand throughout the week, and discount rates hardened. The exchange value of the German mark fell to rather less than 2¾d. The Bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Share	When Dividend.	Ante War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
182,049	Stk	July 31	4	4%	Aldershot 4 p.c. Pref.	..	60–65	..
1,551,868	,,	April 8	2½	2⅞	Alliance & Dublin Ord.	59–64	45–55	..
574,000	,,	July 11	4	4%	Do. 4 p.c. Deb.	76–79	60 62	..
280,000	5	April 29	7½	8%	Bombay, Ltd.	5⅞–6⅛	6¼–6½	5 31/32
60,000	10	Aug. 28	16	12%		29–30	19–20	..
988,110	10	,,	7	7%	Bourne- { 10 p.c.	15–15½	10–11	..
115,000	10	,,	6	6%	mouth Gas { B 7 p.c.	18¼–14	11–9⅜	..
159,740	—	June 27	—	4%	and Water { Pref. 6 p.c.	..	95–97	..
992,045	Stk.	July 11	14	37/-	{ 4 p.c. Deb.	..	55–60	..
734,999	,,	,,	11	31/8	Brentford A Consolid.	261–266	204–209	..
55,000	,,	,,	5	5%	Do. B New	204–209	109–111	..
221,400	,,	June 11	4	4%	Do. 5 p.c. Pref.	109–111	76–78	..
214,775	,,	Sept. 11	11	7½%	Do. 4 p.c. Deb.	91–98	64–66	..
244,300	,,	,,	8	5½%	Brighton & Hove Orig.	208–213	123–128*	123–12
933,500	Stk.	,,	5	5%	Do. A Ord. Stk.	154–159	84–87*	84
600,000	20	Mar. 26	12½	10%	Bristol 5 p.c. max.	..	..	79⅜
175,000	,,	June 11	8	8%	British	44–45	27–29	27½–29
900,000	,,	,,	4	—	Do. 4 p.c. Deb. Stk.	88–90	63–65	60½
900,000	,,	,,	7	—	Buenos Aires 4 p.c. Deb.	85–87	60–68	..
100,000	10	—	—	—	CapeTown & Dis., Ltd.	1½–2½	6½–7	..
100,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4–6	6⅜–7½	..
100,000	Stk.	June 27	4½	4½%	Do. 4½ p.c. Deb. Stk.	70–75	61–66	..
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108–110	..	..
1,518,280	,,	Aug. 14	5/9/4	30/-	Commercial 4 p.c. Stk.	106–108	59–61	..
580,000	,,	,,	5½	26/8	Do. 8½ p.c. do.	108–108	54–57	..
475,000	,,	June 11	8	8%	Do. 5 p.c. Deb. Stk.	69½–71½	50–62	..
900,000	,,	,,	4	—	Continental Union Ltd.	75–79	48–48	..
900,000	,,	,,	7	—	Do. 7 p.c. Pref.	115–118	65–70	..
51,600	Stk.	Aug. 28	14½	12%	Croydon A 10 p.c.	..	150–160	..
279,400	—	,,	11½	9%	Croydon B and C 7 p.c.	..	125–130	109–109 7/16
492,370	Stk.	,,	6	6⅛%	Derby Con. Stk.	128–135	..	..
55,000	,,	—	4	4%	Do. Deb. Stk.	102–104	..	..
1,002,180	10	July 30	10	5/0	European, Ltd.	17½–18	12–14	..
16,398,975	Stk.	,,	4/17/4	30/-	{ 4 p.c. Ord.	98–102	58–61	59–61
2,600,000	,,	,,	8½	26/8	Gas Light { 8½ p.c. max.	76–79	48–50	48
4,062,285	,,	,,	4	4%	and { 4 p.c. Con. Pref.	96–99	65–68	65–66½
4,674,850	,,	June 11	8	8%	Coke { 8 p.c. Con. Deb.	72½–74½	52–55	52½–53½
180,000	,,	,,	10	10%	{ 10 p.c. Bonds	..	..	..
82,500	,,	Sept. 11	5	4½%	Hastings & St. L. 5 p.c.	..	57–62*	..
258,740	,,	,,	8½	9⅜%	Do. 8½ p.c	87–89	42–47*	..
70,000	10	April 29	11	7%	Hongkong & China, Ltd.	16½–16¾	12–12½	..
86,600	Stk.	Aug. 28	9	8½%	Hornsey 7 p.c.	..	110–115	..
181,000	,,	Sept. 11	7½	5⅝%	Ilford A and C.	151–154	88–90*	..
65,780	,,	,,	6⅜	4¼%	Do. B.	115–118	67–72*	..
65,500	,,	June 27	4	4%	Do. 4 p.c. Deb.	92–94	61–64	..
4,949,000	,,	May 14	9	4½%	Imperial Continental	150–160	128–133	128–130
1,235,000	,,	Aug. 14	8½	8½%	Do. 8½ p.c. Deb. Red.	84–86	79–81	..
235,243	,,	Sept. 11	6¼	6¼%	Lea Bridge Ord. 5 p.c.	119–121	87–92*	..
2,498,906	,,	Feb. 26	10	42/6	Liverpool 8 p.c. Ord. { A	211–213	..	..
					{ B	146–148		
806,088	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	..	..
165,736	,,	Aug. 14	7/5/8	32%	Maidstone 5 p.c.	..	56–61	..
75,000	5	June 11	6	8%	Malta & Mediterranean	4½–4⅝	3½–3⅝	..
250,000	100	April 1	4½	4½%	Met. of Melbourne { 4½ p.c. Deb.	99–101	91–98	..
541,920	20	May 29	4	5%	Monte Video, Ltd.	11½–12	12½–13½	..
1,575,892	Stk.	July 30	4½	3⅛%	Newcastle&Gatsh'd Con.	98½–99½	64–65	..
599,795	,,	June 27	3½	3½%	Do. 3½ p.c. Deb	82–88	57–58	..
15,000	10	Sept. 11	—	11%	North Middlesex 10 p.c.	..	13½–13⅝*	..
55,940	10	,,	7/14/0	7%	,, ,, 7 p.c.	14–15	9–9½*	..
300,000	Stk.	May 14	8	8%	Oriental, Ltd.	117–129	108–106	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½–7¾	4⅝–5½	..
60,000	50	Aug. 28	18	7½%	Portsea, Island B	128–131	74–76	..
100,000	50	,,	12	6⅜%	Do. C	118–121	66–68	..
249,980	5	April 29	8	—	Primitiva Ord.	5½–6	1½–2	88/—85/-
499,950	5	June 26	5	—	Do. 5 p.c. Pref.	4½–5	3½–3⅝	66/3—68/9
521,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91–98	71–78	72⅝
600,000	Stk.	July 30	4	4%	Do. ,, ,, 1911	..	49–52	..
946,198	,,	June 27	4	4%	River Plate 4 p.c. Deb.	85–87	49–52	..
150,000	10	May 14	6	6/-	San Paulo { 6 p.c. Pref.	10¾–11	7⅛–8	7⅝
125,000	50	July 2	5	5%	{ 5 p.c. Deb.	47–49	40–42	..
155,000	Stk.	Aug. 28	10	5%	Sheffield A	228–234	81–85	..
209,984	,,	,,	10	5%	Do. B	222–224	81–85	..
523,500	,,	,,	10	42%	Do. C	220–222	70–72	..
188,201	Stk.	Sept. 12	4	4%	Shrewsbury 5 p.c.	..	..	..
90,000	10	June 27	9	10%	South African.	10½–11½	12½–13½	..
6,809,895	Stk.	Aug. 14	5/4/0	30/-	South Met. 4 p.c. Ord.	111–113	59–62	60–61
950,000	,,	July 11	—	5%	Do. Pref.	..	94–96	..
1,895,445	,,	,,	8	8%	Do. 3 p.c. Deb.	73½–74½	52–54	..
234,890	,,	Aug. 14	8½	5%	South Shields Con. Stk.	157–159	97–99	..
962,795	,,	,,	6	3⅞%	S'th Suburb'n Ord. 5 p.c.	114–116	68–73	..
187,558	Stk.	June 27	5	5%	Do. 5 p.c. Deb. Stk.	116–118	88–91	..
647,740	,,	May 14	7½	8%	Southampton Ord.	99–102	68–68	..
121,275	,,	June 27	4	4%	Do. 4 p.c. Deb. Stk.	..	63–65	..
120,000	,,	Aug. 14	..	4½%	Tottenham { A 5 p.c.	135–138	70–75	..
782,278	,,	,,	6	3%	District { B 5½ p.c.	116–117	50–55	51½
181,255	,,	June 26	4	4%	{ 4 p.c. Deb.	87–89	64–66	..
183,880	10	Dec. 30	5	—	Tuscan, Ltd.	5–6	1–2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93–95	45–50	..
286,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	103½–109	62–84	..
					Wandsworth, Wimbledon, and Epsom—			
80,000	,,	Aug. 28	8⅜	55/-	Wandsworth A 5 p.c.	151–156	85 90	..
255,686	,,	,,	6⅛	40/-	Do. B 5½ p.c.	129–134	63–68	..
108,075	,,	,,	—	38/6	Do: C	..	63–68	..
140,865	,,	,,	—	38/6	New Ordinary	..	63–68	..
852,000	,,	,,	6⅛	38/9	Wimbledon 5 p.c.	117–122	65–70	..
98,000	,,	,,	6⅛	40/-	Epsom 5 p.c.	121–126	65–70	..
88,416	,,	June 27	8	8⅛	8 p.c. Deb. Stk.	56–60	49–51	..

* Ex Div.